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# Practical Medicine Series

COMPRISING TEN VOLUMES ON THE YEAR'S PROGRESS
IN MEDICINE AND SURGERY

UNDER THE GENERAL EDITORIAL CHARGE OF

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## VOLUME X

# NERVOUS AND MENTAL DISEASES

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# DISEASES OF THE NERVOUS SYSTEM.

## THE NEUROSES.

### EPILEPSY.

**Epileptoid Convulsions in Alcoholics and Their Relation to Genuine Epilepsy.** Edwin W. Katzen-Ellenbogen[1] of the Trenton (N. J.) State Hospital discusses the above topic and formulates the following conclusions:

1. Alcohol increases all phenonema of epilepsy in cases of idiopathic disease, and there is a tendency to complication of certain alcoholic characteristic mental abnormalities with other epileptic mental disturbances.
2. If epileptic phenonema occur in alcoholics in mature life and persist, they do so beyond the age of forty and are due probably to arteriosclerosis or to syphilis.
3. If fixation of epilepsy occurs in a younger age the probability of larvant epilepsy is quite eminent.
4. Epileptoid convulsions occurring in mature life only in connection with alcoholic debauches are purely toxic in character, acute in effect, and have no relation to idiopathic epilepsy.
5. The family history is a good guide in differentiation because as all cases of epileptics with alcoholism whose family history was traced showed one or more cases of epilepsy in antecedents, two other groups did not have any cases of epilepsy with the exception of a young man whose mother was suspicious of epilepsy, and who probably himself was a case of genuine epilepsy.
6. Epileptic convulsions in the course of delirium tremens are not infrequent but apparently do not need to be considered as a grave complication.

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(1) Ill. Med. Jour., October, 1914, p. 370.

**Roentgen Ray Findings in Epilepsy.** T. M. T. McKennan, George C. Johnston and C. H. Henninger[2] report the findings in *x*-ray examination of the head in ninety-five cases of epilepsy, this work being a continuation of that reported by Johnston to the American Roentgen Society in September, 1913. He then summarized his findings as follows:

"These changes consisted, for the most part, in an over-growth of the anterior and especially of the posterior clinoid processes which in addition to the increase in area and length are folded over and down on the pituitary gland, frequently enclosing it within a bony basket. The fossa is largely or completely roofed over in some cases in addition to this over-growth of the clinoid processes. A large proportion of the cases show a distinctive increased density in the bony tissues forming the roof of the orbits, the sphenoidal sinus and the sphenoidal cells. In quite a number of cases the sphenoidal cells are decidedly blocked with newly formed bony tissues."

The findings in the present series of ninety-five cases are related: Seven of these cases were found to be pituitary tumors, and in only one of these was there any other evidence of involvement of the pituitary gland, aside from the epileptic attacks. In these tumor cases there was no local bony thickening at the base of the skull, in fact local thinning of the body of the sphenoid or the clinoid processes from pressure was found almost constantly.

"In sixteen cases there was local thickening of bony tissues that was confined to enlargement alone of the clinoid processes, or to thickening in the anterior fossa in the base of the skull.

"In twenty-two cases the local bony change was found in two situations; namely, the clinoid processes and in the base of the anterior fossa.

"In thirty-five cases there were bony changes in three situations; namely, the clinoid processes, the anterior fossa, and the body of the sphenoid bone.

"In these cases there is an appearance of thickening along the entire base of the skull.

"In fifteen cases no bony alterations were found.

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(2) Jour. Nerv. and Ment. Dis., 1914, Vol. 49, p. 495,

"An analysis of these latter cases shows that six of them gave clinical evidence of being cerebropathies; two of them gave clinical evidence of being paresis. One case showed a calcareous degeneration in the center of the pituitary region. One case showed on the *x*-ray plate that it was a case of internal hydrocephalus. In one case the picture was taken one week after the first attack, in another case six months after the first attack. The three remaining patients had been epileptic from three to five years with infrequent attacks."

On further analysis of their material, the authors find that frequency of attacks has more to do with the production of local bony changes than the length of time of the existence of epilepsy. The age of the patients on the other hand does not seem to play any role: thus a child 5 years old showed all of the changes described while in a patient of 56 years only one feature was found. In the examination of an equal number of plates from persons not affected with epilepsy they found evidence of similar bony alterations in only 10 per cent. as compared with 80 per cent. in the epileptics (excluding the cases of tumor). Their conclusions are quite startling:

"To sum up, we find a condition of local acromegaly is essential epilepsy. This can only be due to venous stasis. This stasis can only come in one way, namely, from pressure within the box-like structure that contains the pituitary gland. The evidence appears to be in favor of a crippling of this gland by pressure. Hypopituitarism would consequently be the result. It is known that epilepsy accompanies this condition. Therefore, it would appear that so-called idiopathic or essential epilepsy is due to a mechanical injury to the pituitary gland."

The authors speculate freely on the possible origin of the bony changes and their relation to the hypophysis and its secretions. They even venture on an explanation of the occurrence of the fits as follows: "It is our opinion that while it is probable that a moderate degree of hypopituitarism exists in essential epileptics at all times, nevertheless the epileptic attack in these cases is probably precipitated by sudden cessation of practically all secretion from the posterior lobe, due to sudden pressure on the posterior lobe from hyperemia of the anterior lobe. The variability in the course of essential epilepsy would seem to be dependent very largely on that vasomotor factor in the production of hyperemia of the anterior lobe and the cause of this vasomotor disturbance seems to us to be impossible to ascertain."

[There is no report of anatomic examination of any of these cases and we sincerely hope that the authors will follow them up, secure post-mortem examination whenever possible and some years hence publish the findings. —Ed.]

**The Relationship Between Epilepsy and Migraine.** This is an old bone of contention. Both often occur in the same persons and still more frequently in different members of the same family. The relationship would be universally accepted but for the fact that both are such common diseases that their coëxistence often may merely be coincidence. The problem was recently presented to the Boston Society of Psychiatry and Neurology by George A. Waterman,[3] who begins by pointing out the many points of similarity:

"Epilepsy resembles migraine in many of its aspects. Both occur with great frequency as a direct inheritance from the family of either parent. Both recur with more or less periodicity in the individual. On the one hand the picture is that of an explosion of motor energy; on the other that of an explosion of sensory energy.

"Each may be preceded by an aura referable to a disturbance in a definite cortical area. Although the aura of migraine presents the visual type in the form of scotoma and hemianopsia, while epilepsy commonly exhibits the pneumogastric aura, or the sensory or motor disturbance of the arm, face or leg; nevertheless, we may on the other hand have the migraine attack ushered in by paresthesia of the arm, lip and tongue (with or without aphasia), while epilepsy may be preceded by visual disturbance, as dimness of vision or scotoma.

"Not only may the same sort of an aura introduce an attack of epilepsy or migraine in different individuals,

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(3) Boston Med. and Surg. Jour., March 5, 1914.

but in both diseases the warning may make its appearance independently without being followed by an attack. Just as in epilepsy the numbness of the hand or twitching of the fingers may come daily or several times a day over varying periods of time, only to be followed by the convulsive seizure at intervals of weeks, in the same way in a subject suffering from migraine attacks every few weeks preceded by scintillating scotoma, I have seen the appearance of daily attacks of the scotoma alone, over periods of weeks, each attack lasting from twenty to forty minutes.

"The occurrence of psychic symptoms associated with the attack of migraine or epilepsy has been described by various authors; and indeed the attack in either disease may be replaced by a psychic equivalent."

That the diseases may not merely be similar in many respects but actually related is indicated by the following features:

1. The interchange of one disease for the other in different generations of the same family.
2. The appearance of migraine in early life, giving place to epilepsy later, with a resulting disappearance of the migraine or diminution of the intensity of the migraine attacks. In these cases the epileptic seizures may be ushered in by the same aura which gave warning of the earlier attacks of migraine.
3. The development of migraine attacks in patients previously suffering from epilepsy, and in whom the epilepsy has been cured by bromide treatment.
4. The appearance of symptoms of epilepsy in migraine attacks of certain individuals.

Review of the literature shows that many authors have dwelt on the apparent interchange between epilepsy and migraine in different members and different generations of the same family. Kovalevski found of the various hereditary diseases in the histories of patients suffering from migraine, that epilepsy occupies first place. Bourneville found that migraine was present in the relatives of 24 per cent. of his cases of epilepsy. Dejerine on analysis of Bourneville's cases found that in 250 epileptics 51.6 per cent. showed alcoholism, 24.5 per cent. migraine, and 21.2 per cent. showed epilepsy in the ancestors.

Ulrich found that in 500 cases of migraine 99 (or 20 per cent.) showed a direct or indirect relationship to epilepsy. In about 8 per cent. there was epilepsy in the relatives of the patients; in about 12 per cent. migraine and epilepsy occurred in the same individual.

Numerous cases are also referred to in which features of the two diseases occur in the same individuals: Féré says that epilepsy is among the frequent accompaniments of ophthalmic migraine, especially partial epilepsy. Ophthalmic migraine may develop in a person who has previously had partial epilepsy and still has attacks of paresthesia in the side of the body in which the epileptic movements occurred. He also speaks of cases in which migraine may precede epilepsy, or the two may occur together, or in which the migraine may become less severe after the epilepsy has made its appearance. Turner, in his book on epilepsy, states that he has observed a relationship between epilepsy and migraine in 4.3 per cent. of his cases. This relationship manifested itself in one of the four following ways:

(a) Periodic headaches in one parent, and epilepsy in the off-spring, and *vice versa.*
(b) Headaches in early life, replaced by epilepsy in later life.
(c) Epilepsy in early life, replaced by headaches in later life.
(d) Both existing simultaneously in the same individual.

Ulrich recognizes the following conditions to explain the occurrence of epilepsy and migraine in the same patient:

(1) Migraine may exist as a symptom of epilepsy. (2) Both may develop side by side in an individual, springing from the same low order of nervous development. (3) Severe migraine attacks may produce convulsions. (4) Constant recurrence of migraine attacks may lead to the development of true epilepsy. (5) Migraine attacks may disappear as epilepsy develops, just as they do in the development of grave organic diseases of the brain (dementia paralytica).

Spiller expresses his views on the subject by the following remarks:

1. Attacks of migraine occur with nausea and vomiting; this form is known as simple migraine, and usually remains unaltered during the life of the patient.

2. In other cases visual disturbances (hemianopsia, scintillating scotoma, and amaurosis) are associated with migraines, and the disease is known as ophthalmic migraine.

3. When paralysis of the ocular muscles occurs with the migraine, the disease is described as ophthalmic migraine.

4. Migraine, especially the ophthalmic form, is related to epilepsy, and the attacks of migraine may precede for many years the convulsive attacks of epilepsy, although in most cases of migraine, no convulsions are ever detected.

5. In some cases epilepsy appears in the form of one or more of the disturbances seen occasionally with migraine; and later, even after many years, convulsions develop. The disease may be epilepsy from the beginning. It matters little, with our uncertain knowledge of the pathology of the two diseases whether we regard these as abortive cases of migraine that later become associated with epilepsy, or as abortive forms of epilepsy (sensory epilepsy) in which the convulsions later become apparent, provided we recognize a relation between some forms of migraine and epilepsy.

Flatau in a study of 500 cases of migraine has observed a relationship to epilepsy in thirty-six cases, or 7.2 per cent. In certain of these cases the attack in the individual manifested itself first as migraine, then as epilepsy of the *petit mal* type, and finally in later life as convulsive attacks with the epileptic *Dämmerzustände*.

**The Outlook in Epilepsy.** This was the subject of an address before the British Medical Association by William Aldren Turner,[4] the author of an important treatise on epilepsy and whose work has previously been reviewed in the Practical Medicine Series (1910, vol. X, p. 41). First of all Turner takes up the question as to what constitutes a cure of epilepsy:

"A cure has generally been considered to be an arrest of seizures for a certain number of years—the actual

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(4) Brit. Med. Jour., Oct. 17, 1914.

number of years varying from two or three up to ten or more. With so much elasticity in the definition of a cure, it is not unnatural that the cure of any given case of epilepsy would depend on the interpretation, optimistic or otherwise, which the physician would place on the arrest of seizures in his patient.

"We know that cases remit for several years and then relapse sometimes into an incurable state. It is therefore desirable that some feature other than a time limit should be introduced into the definition of the cure of epilepsy. I am therefore entirely in agreement with Pierce Clark[5] and others, who hold that the mental condition of the patient is an essential factor. The cured epileptic should be able to obtain his living. If this state can be obtained without the use of sedatives so much the better, but complete withdrawal of all sedative remedies is not necessary. I have personal knowledge of a number of epileptics who are able to attend to business and carry on all the ordinary duties of life so long as they take a daily dose of bromide, but who at once lose confidence in themselves and sometimes experience a return of symptoms when bromide is withheld for a time."

Turner finds that the epilepsies of infancy and early childhood form one of the most unsatisfactory of the several types of the disease, but that in these early cases there is a tendency to remission at the age of 4 or 5 years, with absence of attacks for some years, sometimes until puberty. The epilepsies of puberty and adolescence, the common periods for the onset of the idiopathic disease are, as a rule, not unfavorable provided that the fits are not too frequent, too severe, or of a psychic character; and provided that the mental condition is satisfactory and that the treatment is undertaken early and conducted persistently. Epilepsy coming on after the age of thirty is on the whole fairly favorable providing it is not symptomatic of tumor or other organic disease, and that alcoholism may be excluded. In Turner's experience, epilepsy supervening on infectious diseases, such as scarlet fever or measles is not an unfavorable type and should stimulate to prolonged medicinal treat-

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(5) Arch. Int. Med., 1912, Vol. 9.

ment. In a general way his experience shows that cases of epilepsy arising without exciting causes and without ascertainable heredity are less favorable for treatment, and more likely to become confirmed cases than those with both an exciting cause and a hereditary foundation. The experience of Turner, like that of many other observers, shows that the major attacks *(grand mal)* are more readily influenced by the bromides than the minor attacks *(petit mal)*. He had the best results with patients who suffered from major fits of relatively infrequent occurrence, while he obtained the least favorable results in epilepsy of *petit mal* type, especially when the attacks were of a psychic character with epileptic automatism as a marked feature.

Turner states that the physician should rely largely on the mental condition of the patient in making an estimate of the curability. To quote:

"The term 'mental condition' here referred to is that which is observed during the intervals of the seizures, and may be called the permanent interparoxysmal mental state.

"The mental state of epileptics varies within limits from what may be regarded as normal, on the one hand, up to a considerable degree of dementia on the other. A certain number of epileptics present no obvious mental deficiency, notwithstanding an inherited predisposition to the disease, the duration of the malady over many years, its onset in early life, and the combination of major and minor attacks, occurring at frequent intervals. Likewise the impaired mental condition found in many epileptics is not necessarily the direct consequence of the seizures, but is an expression of the same neuropathic constitution which gives rise to the fits.

"There can be no doubt that the earlier the onset of the disease, especially when under 5 years of age, the greater is the probability of mental failure—a fact which indicates a more aggravated type of the malady than that which occurs in consequence of arteriosclerosis in later life.

"It is therefore obvious that when a case of epilepsy first comes under observation certain features are present by which the outlook may be surmised. As features of a favorable character may be mentioned the commencement of the disease between the ages of 16 and 20, especially if a hereditary history is obtained, and some obvious exciting cause for the disease is present; the commencement of the disease after 40 or 45 years of age provided organic disease of the brain can be eliminated; infrequent occurrence of the seizures, and the absence of any obvious mental impairment or well-marked stigmata of degeneration.

"In contradistinction to the above-mentioned type of epilepsy, or that class of case which is eminently favorable for treatment, there is the incurable, chronic, or confirmed type, which finds its way eventually into institutions for epileptics.

"The general features of epileptic dementia need not be considered here, but it is revealed by all grades of mental deficiency, from a mere defect of memory, especially for recent events, up to pronounced dementia. Although an integral part of the disease it may be modified to some extent by the duration, the frequency, and the character of the seizures.

"My experience shows that once the mental condition has become materially affected in the direction of dementia, the outlook as regards any real amelioration is unfavorable, although the fits may be kept in abeyance over long periods by sedative remedies."

**Public Care of the Epileptic.** The following data furnish concise information as to how much or,' better, how little is being done by this wealthy nation for the unfortunate epileptic. The facts are stated in a paper by William C. Graves,[6] ex-president of the National Association for the Study of Epilepsy and formerly executive secretary of the Illinois State Board of Charities.

"*Public Care of the Epileptic.* The first special public institution for epileptics was established so recently as 1867 at Bielefeld in Western Germany. This was called the Bethel Colony. In 1886 a colony was founded in England by private philanthropy. In 1892 Ohio opened its institution at Gallipolis. From these beginnings the movement has grown splendidly. In Germany there

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(6) Ill. Med. Jour., October, 1914, p. 373.

are fifty institutions having a special provision for epileptics. Switzerland has three, Holland two, Belgium also makes provision for epileptics. England now has nine institutions of which four or five are of some size. Australia has an institution. In this brief summary reference is made to sane epileptics. Everywhere, as in Illinois, insane epileptics are provided for as insane persons and only too often the real injustice of sane epileptics confined with insane persons is met.

"Following the lead of Ohio, which in its institution cares for both sane and insane epileptics, New York was the second American state to found an epileptic colony. This was at Sonyea, in 1894. This institution is for sane epileptics. Massachusetts, New Jersey, Kansas, Missouri, Texas, Indiana, Pennsylvania, Virginia, Connecticut, Illinois, Iowa, Michigan and Wisconsin have been added to the list of states making special provision for epileptics. Except for Indiana, which has a colony in operation, the states in our locality, viz.: Illinois, Iowa, Michigan and Wisconsin, have just swung into line and are in the early reaches of progress toward a definite result.

"In the province of Ontario, Canada, there is an epileptic colony.

"There are two private institutions in the United States, one the Emmaus Asylum in Missouri and the other the Passavant in Pennsylvania.

"*Massed Information About North American Institutions.* During the present year I asked ten pertinent questions of superintendents of the fourteen public and private places on the North American Continent that have institutions in operation and out of the replies, omitting as far as possible the details, it appears that the total population on May 1, 1914, was about 7,000 patients. These institutions own about 9,500 acres of land of which about 3,900 acres are under cultivation; and the value of the land is about $810,000. These institutions have 390 buildings valued at $4,800,000, with equipment, fixtures. furniture, furnishings, etc., of a value of about $900,000, making a total property value of about $6,500,000. The *per capita* cost and analysis of what items go to make up that figure proved an interesting subject. The lowest *per capita* was $62.91 at the Hospital for Epileptics, Woodstock, Ontario, and the highest *per capita* cost was $248.20 at the Passavant Memorial Homes for the Care of Epileptics at Rochester, Pa.

"During the last two years, the number of new institutions authorized was four, an increase of 36 per cent which is encouraging.

"Indiana, Virginia, Texas, Connecticut and Ontario were reported as having laws that give institutions the power of custodial detention over patients. New York, Massachusetts, Ohio and Kansas have that power over insane, or dangerous, epileptics, New Jersey reported broader powers. Pennsylvania and Missouri answered the question in the negative.

"Conservatively estimating that there is one epileptic to each 400 of the population of the United States and Canada, there are 250,000 so afflicted among our 100,000,000 souls, and suppose that one-half of these, or 125,000, need care in special colonies, then indeed the fact that we are so caring for only 7,000 shows the great need of a campaign to create epileptic colonies.

The reasons which are given in the foregoing are sufficient to prove that the epileptic is best off removed from ordinary society. It is a strange yet fortunate thing that epileptics are remarkably sympathetic to the needs of each other and the devotion with which one epileptic will watch another through a seizure, safeguarding him so far as possible, is often beautiful to see. This is another of the many reasons which make it desirable that epileptics live together."

## DISEASES OF THE MENINGES.

**Parameningococcus and its Antiserum.** Some years ago, it was found that certain cases which clinically behaved like cases of typhoid fever, failed to give the Widal reaction and that the causative bacillus, while morphologically like the typhoid bacillus, differed from it in certain cultural characteristics. The experience has been repeated with epidemic meningitis. It has been found that in certain cases the otherwise so beneficial antimeningococcus serum fails, and yet the organism appears identical with the ordinary *Diplococcus intracellularis.* In 1909, Dopter, the discoverer of the antimeningitis serum in general use in France, ascertained that there is type of organism called by him the parameningococcus, which, while resembling the common meningococcus in fermentation and cultural properties, differs from it in certain immunological reactions. It has been found that this organism may cause an acute meningitis which is not controllable by means of the ordinary antimeningococcus serum but does respond to a special antiserum prepared with cultures of the parameningococcus.

Martha Wollstein[7] of the Rockefeller Institute for Medical Research, has made extensive serologic tests with two cultures of parameningococcus obtained from Dopter. She states that Dopter's parameningococci remain in a class by themselves, differing serologically more or less from other diplococci. Although Dopter first found them in the nasal mucus of persons who had been in contact with meningitis patients other observers soon demonstrated their presence in the blood and cerebrospinal fluid. Menetrier[8] was the first to report a case of meningitis due to this organism. The patient was an infant and the symptoms were apparently mild but the cerebrospinal fluid contained abundant cocci, most of which were extra-cellular. Injections of the usual antimeningococcus serum were followed by intensification of the symptoms. Dopter,[9] having observed seven cases of parameningococcus meningitis, prepared an antiparameningococcus serum in 1912 and this proved to be successful.

Dr. Wollstein formulates the following conclusions:

The parameningococci of Dopter are culturally indistinguishable from true or normal meningococci, but serologically they exhibit differences as regards agglutination, opsonization and complement deviation.

Because of the variations and irregularities of serum reactions existing among otherwise normal strains of meningococci, it does not seem either possible or desirable to separate the parameningococci into a strictly definite

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(7) Jour. Exp. Med., 1914, Vol. 20, p. 201.

(8) Bull. et Mém. Soc. Méd. d-hôp de Paris, 1911, XXXI, series 3, 32.

(9) Semaine Méd., 1912, Vol. 32, p. 298.

class. It appears desirable to consider them as constituting a special strain among meningococci, not, however, wholly consistent in itself.

The distinctions in serum reactions between normal and parameningococci are supported by the differences in protective effects of the monovalent immune sera upon infection in guinea-pigs and monkeys.

It is therefore concluded that it is highly desirable to employ strains of parameningococcus in the preparation of the usual polyvalent antimeningococcus serum. It remains to be determined whether it is better to employ the parameningococci along with normal meningococci in immunizing horses, or to employe normal and para strains separately in the immunization process and to combine afterwards, in certain proportions, the sera from the two kinds of immunized horses. Brodin and Vallery-Radot[1] report the case of a girl 18 years old who was admitted to the hospital with symptoms of meningitis and in the course of three days received 120 c.c. of antimeningococcus serum. As the symptoms became worse the possibility of parameningococcus meningitis suggested itself, and 40 c.c. of antiparameningococcus serum were given when the patient was already comatose. Rapid improvement took place and after 3 more injections, or a total of 155 c.c. of this serum, recovery occurred. The presence of the parameningococcus in the cerebrospinal fluid was subsequently shown by Dopter.

**Syphilis of the Meninges.** A report was made by Drs. E. R. LeCount and Kaethe Dewey[2] of the examination of between fifty and sixty brains with changes in the meninges, some of them obviously syphilitic because of the definitely gummatous nature of the discrete masses of granulation tissue, others more cicatrized supposed also to be syphilitic because of their almost exclusive occurrence in bodies with changes, such as syphilitic scars in the capsule of the liver, gummas of the liver or spleen, syphilis of the aorta, etc.

The interest of the study centered about a careful

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(1) Bull. et Mém. Sóc. Méd. Hôp. de Paris, 1914, Vol. 37, p. 1210.

(2) Trans. Chicago Path. Soc., Jan. 1, 1914, p. 119.

review of the evidence of various kinds for the origin of the scars in the meninges in a syphilitic infection. In many instances definite gummas were found in deeper locations in the brain, usually minute and frequently in the deepest parts of the sulci about the fossa sylvii or in the cortex of the brain about such sulci, associated with the superficial scars which, as stated, first excited interest on account of their being encountered only in brains of bodies with indications of a syphilitic infection in other parts of the body. These scars, called "arachnoid scars" by Drs. LeCount and Dewey, are frequently lozenge-shaped, located in the outer parts of the arachnoid membrane, and in the older lesions of this sort necrotic centers were frequently found surrounded by heavy bands of collagenous connective tissue resembling those characteristic of keloids. The scars were found most commonly stretched across the mouth of a sulcus.

In addition to the association of these scars with syphilitic lesions still other focal changes in the meninges were found which were not so thoroughly cicatrized, transitional alterations and these, too, associated not only with gummas of the brain and syphilitic lesions elsewhere in the body, but also with the scars of the arachnoid. Some corroboration was also obtained from tests made by Drs. Moody and Jackson of the blood and cerebrospinal fluid, the Wassermann reaction or the color reactions with colloidal solutions of gold known as Lange's test.

The observations on the whole were that scars in these meninges, arachnoid and pia, might be used in post-mortem examinations as evidence of a syphilitic infection in much the same way as the stellate scars in the capsule of the liver so universally regarded by those versed in pathologic anatomy as syphilitic.

Among the brains studied there were several with the rather unusual hyperplastic or nodular gummatous meningitis. Although the clinical histories were not so full as might be desired since the greater part of the material accrued from post-mortem examinations made to ascertain the cause of death, so-called "coroner's cases," no reasons developed for believing that any considerable number of the persons had paretic dementia. In ten instances death was sudden and unexpected.

One feature of the study of more than ordinry interest is that the alterations found in the meninges were usually on the vertex, whereas the usual accounts of syphilis of the meninges refer to it as a basilar meningitis.

**The Cerebrospinal Fluid in Poisoning by Carbon Monoxide, Arsenic and Lead.** J. Rothfeld and S. v. Schilling Siengalewicz[8] of the University of Lemberg produced intoxication by these substances in twenty dogs. On account of the difficulty in securing sufficient fluid by lumbar puncture in dogs, they proceeded by etherizing the animals and puncturing between the occiput and atlas, usually securing from 4 to 6 c.c. of clear fluid without any injury to the animals. The physical properties of the fluid were determined, cell count was made, globulin tested by the Nonne-Apelt ammonium sulphate test and the sediment was examined after centrifugalizing the fluid for half an hour with a high-speed centrifuge. Complete blood examination was also made before and after the poisoning and in a few cases cryoscopy was employed. To determine the normal cell content of the fluid in dogs, ten normal dogs were examined and showed 2 to 3 lymphocytes per cubic mm. In eight satisfactory cases of carbon-monoxide poisoning the fluid obtained after five hours was clear and in four cases gave positive globulin reaction. The number of cells was as a rule increased up to 24 cells per c. mm. and seemed to be proportionate to the carbon-monoxide content of the blood. With the reduction of the latter the lymphocytosis disappeared. The blood always showed marked leukocytosis, but there was apparently no relationship between the leukocytosis and the cell content of the spinal fluid. The freezing point which normally was found to be —.56° C. was found to range from —.64° to 1.60° C.

To produce arsenic poisoning from 2.5 to 5 milligrams per kilogram of body weight were injected hypodermically, which always resulted fatally, so the fluid had to be removed in from two to four hours. The cell count in four cases was 3, in two cases 6 and in one case

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(8) Neuro. Centrlbl., 1914, Vol. 33, p. 303.

11 per cubic millimeter. The globulin test was very slight in two cases and marked in the others. The blood showed slight leukocytosis. Marsh's test for arsenic was always negative in the spinal fluid.

To produce lead poisoning the animals were given from 15 to 20 grams of lead oxide with their food for three or four days. In five successful cases the spinal fluid was always clear and in no instance did it show any increase in cells or a positive globulin test, while the blood showed marked leukocytosis in four cases and slight in one case.

## SYPHILITIC DISEASES OF THE NERVOUS SYSTEM.

### DIAGNOSTIC MEASURES.

**Importance of Examination of the Spinal Fluid for the Prognosis of Isolated Pupillary Disturbances of Syphilitic Origin.** In these volumes we have repeatedly called attention to extensive investigations by Nonne, of Hamburg, of the syphilitic nervous diseases, his epoch-making work on the cerebrospinal fluid and his careful studies of pupillary disturbances in alcoholism and other non-syphilitic conditions. Recently Nonne[4] has published his observations on twenty-three cases of pupillary disturbances in syphilitic individuals and by following up the cases he has succeeded in forming conclusions as to the prognostic importance of such disturbances when viewed in conjunction with results of laboratory tests. According to the condition of the spinal fluid, cases divide themselves into five groups, instances of each of which will be related:

I. *Fluid normal from the beginning. Rudimentary processes.*

Case 1. A nervous merchant, aged 35, contracted syphilis in 1899. He had been vigorously treated and was first examined by Nonne in September, 1912. The right pupil was larger than the left and did not react to light; the left pupil was normal. There were no other findings. All the "four reactions" were negative. The

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(4) Deutsch Zeitschr. f. Nervenh., 1914, Vol. 51, p. 158.

patient was re-examined in December, 1913, and in February, 1914, and the pupils were unchanged and the four reactions still negative. There were no subjective symptoms.

Cases 2 and 3 are very similar. Attention is called to another case (4) reported elsewhere by Nonne and Wohlwill,[5] that of a woman with saddle nose and signs of syphilitic aortitis but who presented no findings on the part of the nervous system except loss of pupillary light reaction. The blood gave a positive Wassermann test, but all of the spinal fluid tests were negative. At the necropsy, syphilitic aortitis was found, but the brain and spinal cord were normal both to the naked eye and on microscopic examination.

II. *Spinal fluid at first pathologic; later normal.*

Case 5. A man, aged 28, had syphilis in 1903, and when examined in February, 1912, the right pupil was smaller than the left, reacted sluggishly to light and there was paralysis of accommodation on the right side. In August, 1912, there was paralysis of accommodation in both eyes. All four reactions were positive. The patient had four doses of 0.3 gm. salvarsan and a course of potassium iodide. In April, 1913, the accommodation in the right eye had improved, and in September, 1913, the left pupil was dilated and rigid, while the right one reacted sluggishly. Accommodation was normal; four reactions were normal. In February, 1914, the left pupil reacted a little to light, but not on convergence.

Case 6 is similar. All reactions were positive; pupils were sluggish to light. After salvarsan treatment, pupils and reactions were entirely normal.

III. *Spinal fluid improved but not entirely normal. Clinical improvement.*

Case 7. A man, aged 41, contracted syphilis in July, 1910, was treated, but after half a year he had specific sore throat and papules on the head. He was treated more, and after a year had a convulsive seizure, severe headaches, and decreased vision in the right eye. When examined in October, 1911, all four reactions were positive, the right pupil was smaller than the left and both pupils reacted sluggishly to light. Optic neuritis was

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(5) Neurolog. Centribl., 1914, No. 10.

present on the right side. After four doses of salvarsan and a course of potassium iodide the patient's subjective complaints disappeared in three weeks and only the inequality of the pupils remained. In May, 1912, the Wassermann test, both with blood and spinal fluid, was negative, but positive globulin test and slight lymphocytosis remained. In February, 1913, the lymphocytosis also had disappeared but the globulin test remained positive. On the last examination, in February, 1914, the patient remained subjectively well and the pupils were unchanged.

In Cases 8, 9 and 10 there was also marked clinical improvement, but one or more of the "four reactions" remained positive.

IV. *Spinal fluid persistently pathologic. Clinical picture stationary.*

Ten cases are related in which the spinal fluid and blood gave positive reactions, uninfluenced by treatment, but the clinical picture remained unchanged for years. Patients of this kind are usually considered certain candidates for tabes or paretic dementia, but nothing of that kind has materialized in these cases, which have been watched for from three to six years.

V. *Pathologic fluid: further development of the clinical picture.*

One patient who at first presented only an internal ophthalmoplegia developed the full picture of tabes in five years, while two others, who at first had pupils which did not respond to light, developed paretic dementia within a year.

In discussing this series of cases, Nonne states that in nineteen of the twenty-three cases the findings on the first examination would lead one to assume that severe syphilitic nervous disease would develop, but this occurred in only three of the cases. The following conclusions are formulated by the author:

1. Prolonged observation of cases of isolated pupillary disturbances has shown great variation in the further evolution of the cases, some remaining stationary, while others develop extensive syphilitic nervous disease.
2. Examination of the spinal fluid is of great importance in judging the significance of the pupillary anom-

alies, as it shows (a) that in the presence of normal fluid these pupillary disturbances may represent merely a healed or rudimentary process in the central nervous system, and (b) that they also may remain unchanged when the fluid is abnormal.

3. It is also seen that the prognosis in isolated pupillary anomalies on a syphilitic basis can not be based altogether on the result of the "four reactions" and that we must be cautious not to make an unduly unfavorable prognosis when the spinal fluid tests are positive.

**Syphilitic Tests in Latent and Treated Syphilis.** E. P. Corson-White and S. D. W. Ludlum[6] say that one of the most definite characteristics of syphilis is the complete disappearance of symptoms at certain periods, giving rise to a state of apparently perfect health. This condition, described by Ehrlich as a "non-sterilizing immunity," may occur spontaneously or as the result of treatment and it may last for years. However, so long as spirochetes remain alive in the body, a relapse may occur or serious parasyphilitic disease may develop. The voluminous literature on the Wassermann reaction in such latent cases shows that only about 30 per cent. of these apparently healthy patients have a negative reaction. By a so-called provocative treatment, consisting of a short course of mercury or a small dose of salvarsan, Donath found that about 9 per cent. of the negative cases would become positive. He compares the influences of the treatment to that of quinine on latent malaria. Other authors have offered the following explanations: (a) The liberation of endotoxins by the immediate destruction of a small number of spirochetes gives a sudden intense stimulation to antibody formation; (b) the dose of spirillicide insufficient to kill the treponema actually stimulates their activity; (c) the endotoxin liberated from the dead organisms gives rise to that substance in the serum on which the Wassermann reaction depends. Most of the other laboratory methods, as the demonstration of the spirochete, or the inoculation of animals, etc., fail at this time. The authors have made numerous tests, using both the original Wassermann test, the Noguchi modification and the Noguchi luetin test, on whole fam-

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(6) Jour. Nerv. and Ment. Dis., 1914, Vol. 41, p. 386.

ilies of tabetic patients, and similar tests in apparently well-treated patients with syphilitic histories. In the latter class, they find that the negative reactions occur slightly earlier with the Wassermann test than with the Noguchi modification and that both of these become negative earlier than the luetin test. The most marked reduction in the reaction appears in those individuals treated with mercury and salvarsan or neosalvarsan and next in those with salvarsan or neosalvarsan alone. The difference between these two is slight. Salvarsan apparently acts more rapidly than neosalvarsan, but the latter seems to remain longer in the blood than salvarsan. Mercury gives a slow, steady diminution. They conclude that negative reactions do not necessarily mean an absence of syphilitic infection or a cure, although the reaction has been negative for a considerable time. The luetin test is less easily influenced by treatment and the authors consider it the best criterion of genuine cure or of absence of infection.

**The Wassermann Reaction and its Application to Neurology.** This was the subject of an extensive research by Paul Fildes and James McIntosh,[7] who did their work at the London Hospital. Their conclusions are as follows:

1. In general diagnostic work, exclusive of nervous conditions, a positive reaction is so constant in active syphilis that such a diagnosis, made in the face of a negative result, will require very special support on other grounds before it can be considered probable.

2. A positive reaction in the cerebrospinal fluid indicates a syphilitic lesion of the central nervous system.

3. In active untreated cases of dementia paralytica, tabes dorsalis and cerebrospinal syphilis the reaction is positive, both in the serum and cerebrospinal fluid. In cerebral syphilis without involvement of the spinal cord the cerebrospinal fluid is usually negative, except in the latter cases the strength of the reaction has no certain diagnostic value.

4. The reaction is apt to be negative in the serum or cerebrospinal fluid in cases of hemiplegia, non-progressive tabes dorsalis, and old lesions of the nervous system,

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(7) Brain, 1913, Vol. 36, p. 193.

especially in cases of stationary congenital syphilis. It is also usually negative in the serum, particularly in very recent nerve lesions of the late secondary period, and in the cerebrospinal fluid, particularly in treated cerebrospinal cases.

5. The occurrence of a positive reaction in one of the test-fluids when the other is negative is so common that a reaction found negative in one fluid only is insufficient to exclude syphilis.

6. Pure "parasyphilitic" lesions do not respond satisfactorily to treatment, as shown by the slight effect on the reaction in the cerebrospinal fluid. Cerebrospinal lesions react very readily to treatment. The celerity with which the reaction in the cerebrospinal fluid responds to treatment is an index of the "parasyphilitie" or "syphilitic" nature of the case.

7. The positive reaction in the serum is rapidly made negative by treatment in acute syphilis; but in chronic syphilis this effect is produced very slowly. In the cerebrospinal fluid, on the other hand, the rate of reduction of the reaction does not depend on the duration of the infection. Thus, in gummatous lesions of the central nervous system, as also in acute secondary cerebrospinal syphilis, the effect of treatment on the reaction in the cerebrospinal fluid is rapid.

8. The "provocative" injection of salvarsan for the purpose of exciting an exacerbation of the reaction has some, but probably an exaggerated, diagnostic value.

**Lange's Colloidal Gold Test of Cerebrospinal Fluid.** This was described in detail in the Practical Medicine series, 1912, Vol. 10, p. 61, where attention was called to its value in differentiating between various types of syphilitic and other organic diseases of the central nervous system. Since the original publication by Lange, two years ago, it has been tried out all over the world and, in the main, the test has been found very useful, though there is some difference of opinion as to whether the curves described by Lange as characteristic of cerebrospinal syphilis and tabes are as constant as claimed, and whether a slight reaction in a spinal fluid otherwise normal, necessarily means organic disease. In our review of Lange's report in 1912, we prophesied that more or less conflicting reports would be forthcoming on account of the extraordinary care required in the preparation of the reagents, and because of the disturbing influence of the slightest trace of blood or other extraneous matter in the spinal fluid. In this country, reports on the test made by Grulee and Moody[8] and Sippy and Moody[9] have, in the main, upheld the claims made by Lange. Recently M. E. Flesch[1] has reported his experience with a large number of tests made in Schwenkenbecher's Clinic in Frankfurt. To some extent he agrees with Lange that in beginning syphilis of the central nervous system this test gives an earlier indication of involvement of the nervous system than the other tests used, but on the other hand, he warns against accepting as necessary evidence of organic disease a slight reaction in the first tubes. Further control tests carried on for a period of years will be necessary to decide this point. He finds that there are no characteristic curves for cerebrospinal syphilis and tabes while there is a characteristic curve for paretic dementia. In twenty-three cases of tabes the reaction was always positive, but he only found the curve considered characteristic by Lange in nine cases. But, on the other hand, he did not find this curve in cases other than tabes. Flesch agrees with Lange that as a rule there is a parallelism between the gold test and the lymphocytosis and that the gold test is more delicate than the Nonne-Apelt "phase 1" (ammonium sulphate) test for globulin. He also agrees with Lange that a positive Wassermann test with the spinal fluid can only be expected when the gold test is of a certain intensity, and that with only a slight discoloration in two or three tubes one may be quite certain that the Wassermann test will turn out to be negative. Like Lange, he has never found a negative gold test when the Wassermann test on the spinal fluid was positive. Flesch finds that, in a general way, the intensity of the reaction is proportionate to the total proteid content

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(8) Jour. Amer. Med. Ass'n., July 5, 1913.

(9) Trans. Amer. Ass'n., Phys., 1913.

(1) Zeitschr. f. d. gesamte Neurol. w. Psychiat., 1914, Vol. 26, p. 318.

of the fluid, but this parallelism is not so distinct as to warrant the conclusion that the gold reaction is directly dependent on the proteid content, but it is more probable that both depend on a third and unknown factor which also determines the qualitative differences in the various types of gold reaction.

Roger I. Lee and W. A. Hinton[2] report their experience with the test at the Massachusetts General Hospital. Their cases include twenty-four of tabes, twelve of paretic dementia, fifteen of other types of syphilis of the central nervous system and many other cases of nervous disease; also various non-nervous cases. In only two instances did they obtain a gold reaction typical of syphilis in the absence of blood Wassermann reaction, spinal fluid Wassermann reaction, increase in cells and presence of globulin. In both of these cases the gold reactions were confirmed by the clinical diagnosis. A negative gold reaction was obtained in only two cases in which the condition of the central nervous system was diagnosed as syphilitic. The authors appear to be satisfied with the test, judging from their conclusions:

"A gold reaction typical for syphilis is nearly constant in cases of syphilis of the central nervous system.

"This test is more delicate than the blood Wassermann reaction, spinal fluid Wassermann reaction, cell count, and globulin content.

"The test has the advantage that it gives a reaction with pathologic spinal fluids due to other causes than syphilis, that is characteristic and easily differentiated from the reaction typical for syphilis.

"Our experience confirms the findings of other observers that the gold test is delicate, and that the margin of error is exceedingly small."

Another comment on the usefulness of the Lange test comes from Arthur Glaser,[3] who, however, has only twenty-five cases to his credit. His main conclusion is that while the test is a pretty one and theoretically interesting, it offers so many technical difficulties and is so time-consuming that, in its present form, it is scarcely of practical value.

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(2) Am. Jour. Med. Sci., July, 1914.
(3) Neurol. Centribl., 1914, Vol. 33, p. 686.

**The Spirochaeta Pallida in the Brain in Cases of Paretic Dementia.** E. Forster and E. Tomasczewski,[4] whose demonstration of the spirochete in pieces of tissue secured by puncturing the brain of the living paretic patient was recorded in the Practical Medicine Series, 1913, Vol. 10, p. 225, now report positive results in twenty-seven out of sixty-one cases examined, that is, in 44 per cent. Each frontal lobe was first punctured, and if no spirochetes were found the puncture was repeated once or twice on each side. The percentage recorded by these authors is the highest so far reported. Of previous observers, Noguchi had positive results in forty-eight of 200 cases, Marinesco and Minea in three of twenty-seven, Levaditi, Marie and Bankowski in eleven of forty-one, Geber, Benedek and Tatar in two of fifteen cases. The present authors do not find any relationship between the occurrence of spirochetes and the interval between infection and the onset of the mental disorder, the duration of the latter, or the clinical picture. Material from fifty-three patients was inoculated into sixty rabbits and thirteen monkeys, but all inoculations were unsuccessful. This supports the assumption that the spirochete in the brain of paretics differs biologically from the ordinary spirochete of syphilis. This conclusion is not rendered untenable by the reports of successful inoculations by other authors, particularly by Noguchi, and by Uhlenhuth and Mulzer, as the percentage was very small, the lesions produced very slight, and the period of incubation very long.

**Brain Puncture Through the Orbit in Paretic Dementia.** This was described by L. Beriel five years ago.[5] In more recent publications[6] the author describes the use of this procedure for the purpose of obtaining small pieces of cortex of paretics for examination for the *Spirochaeta pallida.* Spirochetes were found in two cases out of three examined. A special trocar is passed along the outer wall of the orbit so as to enter the cranial cavity through the outer and narrow portion of the sphenoidal fissure which does not contain any important

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(4) Deutsche Med. Wochenschr., 1914, p. 694.
(5) Lyon Chirurg., Aug. 1, 1909.
(6) Lyon Med., 1913, Vol. 121, p. 862; and Neurol. Centrlbl., Jan. 2, 1914.

nerves or vessels. The trocar is from 8 to 10 cm. long and from 1 to 1.2 mm. wide. Into this is fitted a second and sharp trocar which is only used for piercing the skin and is then replaced by a third and blunt one. On passing through the outer portion of the fissure the trocar comes in contact with the tip of the temporal lobe or the lower part of the frontal lobe and either subdural fluid or brain substance may be secured as desired. The author has made this puncture hundreds of times without any mishap and says that it is no more painful than lumbar puncture and has the advantage that the patient need not lie down afterward. However, he advises first to practice it on the cadaver so as to learn to avoid going too near the median line, when serious damage might be done. He adds the suggestion that medicinal substances might be introduced by this route.

## MODERN METHODS OF TREATMENT OF THE SYPHILITIC DISEASES OF THE NERVOUS SYSTEM.

**Vital Staining in its Relation to Chemotherapy.** There has been much discussion as to the manner in which salvarsan injected intravenously or intraspinously reaches various parts of the nervous system and as this problem is of great practical importance the following report of a paper by Frederick Tilney[7] before the New York Neurological Society on February 3, 1914, and the resulting discussion are of interest:

Dr. Tilney said that it had been a question in his mind by what avenues the salvarsan reached the nervous tissues, if it got there at all. The theory that salvarsanized serum introduced intraspinously penetrates into the depths of the nervous system by means of the lymphatics is based on an assumption in support of which there is little or no anatomic fact. Recalling the facts, that the vital stains in Ehrlich's hands were the basis of chemotherapy, that such stains and salvarsan are closely allied in their chemotaxis, and also that Ehrlich has found trypan red (a vital stain) to be a trypanocide, it seemed justifiable to use these stains on living animal tissue and especially to observe what happens when *intravitam*

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(7) Jour. Nerv. and Ment. Dis., 1914, Vol. 41, p. 454.

injections are made intraspinously, intravenously, intra-arterially, and subcutaneously.

The cat was selected as the first animal to be observed, and the vital stain, trypan blue, used. The first experiment was the injection into the subarachnoid space of one-tenth of 1 per cent. solution of trypan blue. Goldmann has experimented with rabbits and has found that these animals when so injected die in three hours, first developing opisthotonos and then passing into coma. The animals Tilney injected showed no such disorder. At post mortem it was found that the dura mater had been stained intensely. The specimens demonstrate this fact better than anything else. The brain itself was stained; in the gross, the tissue seemed to have taken a diffuse stain. None of the other organs of the body was stained. Microscopic preparations showed that the trabeculae of the pia mater extending into the cord and brain as well as the walls of the blood vessels were stained. It is apparent, therefore, that trypan blue gets into the substance of the nervous tissues along the lines of these trabeculae and by the blood vessels. The ganglion cells and nerve fibers were not stained.

The next experiment was an intra-arterial injection, which showed a marked staining of intestines, liver, spleen, kidneys, and conjunctiva, but no stain in the central nervous system or its covering.

The third injection was made intravenously. The animal was allowed to live for twenty-four hours, as in all the experiments. Here Tilney was surprised to find the dura mater, pia and pituitary body distinctly stained, although not so intensely as by the intraspinous injection. Frozen sections of this material showed that none of the stain had penetrated into the cord.

The last animal was injected subcutaneously, and while it showed the usual staining of the organs, no region or part of the nervous system showed any stain whatsoever.

It would seem from these limited experiments that we have at least a suggestion that the salvarsan administered intraspinously reaches the deeper portions of the central nervous system by two very distinct routes: first, by the trabeculae extending from the pia mater; and, second, by penetrating the vessels and thus having access to the deeper structures of the cord and brain. Goldmann makes the suggestion that this *intravitam* staining is interesting not only from a histologic standpoint, but that it may serve as a medium for carrying in remedial agents. It is proposed to carry out this idea on monkeys and rabbits which have already been infected by spirochetes to see whether the same results may be obtained as were produced from the intraspinous and intravenous injections in the cat.

Undoubtedly, the intraspinous introduction of salvarsan seems to be the method of selection, and if the intravenous method is used larger doses must be employed to get corresponding results.

Dr. Zabriskie asked how far Dr. Tilney found his experiments to agree with those of Kramer of Cincinnati.

Dr. Strauss said that two years ago he had injected a dog with a 1 per cent. solution of collargol into the subarachnoid space, using a fair quantity. The dog lived five or six hours and then died, probably from the poisoning. To his surprise, he not only found the collargol in the subarachnoid space but in the central canal of the cord. He could not understand this until he saw Kramer's specimen. Dr. Strauss said he thought Kramer used methylene blue, and he likewise found that this substance had gone into the central substance of the cord. Kramer had also demonstrated to him something which he said had been pointed out about fifty years ago, namely, that there is an opening from the central canal outward in the region of the conus.

The interesting feature of Dr. Tilney's experiments is not so much that when he injects trypan blue he finds it going into the brain and cord in that way, but that if he injects it intravenously he finds it in the dura and pia. Granting that it goes there, there is no reason that it should not go farther into the cord and brain. That bears out his contention that in all these discussions of the intravenous and intraspinous use of salvarsan those who claim that in giving it intravenously we are not getting it in the central system are in error. Clinical experience and a study of the spinal fluid shows that when intravenous injections are given the drug reaches the central nervous system.

Another point that will be brought up in the future is the work that is being done at present to show whether there is any arsenic in the 12 c. c. of serum taken from the blood. Perhaps it will be shown that there the amount is very minute, perhaps 1/20 of a milligram of arsenic. When introduced into the circulation it becomes fixed so rapidly to the cells that it is not in the blood.

The interesting feature of Dr. Tilney's experiments is that it has been shown that intravenous injections will reach the cord, but large doses are needed

Dr. Jelliffe, in response to Dr. Strauss's remarks, said that Dr. Kramer did not employ a stain which, like trypan blue, was of the same chemical structure as salvarsan. In other words, aniline blue is a crude aniline stain, as it enters into commerce, and has chemically no affinities with the substances on which Ehrlich built up his salvarsan. Kramer's results, therefore, could not be brought into relationship with the results reported.

Dr. Rosenbluth said that he had had no experience with trypan blue but would apply his experience with methylene blue in staining *intravitam,* where the reaction involved is surely chemotatic. The results obtained correspond to the degree of concentration of the dye that reaches the central nervous system, so in routine work with this method it is always important to be sure that the return of fluid from the veins of the injected animal be well colored with the dye, so as to be sure that all of the intracranial vessels are engorged with the dye; and if we wish a more positive elemental stain by this method we actually sprinkle the powdered methylene blue on the living neural substance *in situ,* as first suggested by Cajal; so that the uncertainty of the stain is not due to any uncertainty of chemotaxis but to the uncertainty of bringing the reagent to the tissue to be acted on. That the venous route is feasible is shown by the fair proportion of successful stains by this method, especially if one is careful in fully oxidizing by good exposure to the air.

That this is a chemotactic reaction is further demonstrated by the experience of Lawen and Gaza in their experiments in connection with epidural anesthesia, that intraspinous injection of an aniline dye goes as far as the base of the brain but only stains the parts by infiltration and not by circulatory transmission.

Dr. Rosenbluth also reported on four patients who had received salvarsan treatment, receiving about fourteen intravenous injections, in whom the cerebrospinal fluid was examined for arsenic and arsenic was found in 80 per cent. of the tests.

Dr. Jelliffe said that arsenic had been found in the central nervous system following the injection of a heterologous serum from another patient. Such patients had not received any arsenical compound other than the serum from another treated patient, and yet this admittedly small amount of arsenic had been sufficient to be determined as arsenic in the cerebrospinal fluid. When it was recalled that even following large doses of salvarsan intravenously no arsenic had been found in the cerebrospinal fluid, it was a matter of possible far-reaching significance that the small amount in a heterologous serum could yet be found in the cerebrospinal fluid.

*The Value and Danger of Intraspinous Treatment* are discussed by B. Sachs, I. Stráuss and D. J. Kaliski[8] in a paper on the treatment of syphilis of the nervous system based on the large material of the Mt. Sinai Hospital in New York. It comprised fifty-five cases of tabes, twenty of paretic dementia, forty-one of cerebral and cerebrospinal syphilis, three of optic neuritis and two of syphilitic spondylitis. After discussing the various methods in vogue they make the following statements as to intraspinous treatment:

That all intraspinous injections are not without danger to the patient is evident enough. On a number of occasions after the careful introduction into the canal of salvarsanized serum the patient required opiates to relieve the intense pain. The general condition was also much weakened and the legs partially paralyzed. One patient with early paresis within twenty-four hours after an intraspinous injection of 6 mg. of neosalvarsan developed complete paralysis of the legs and marked paralysis of the vesical and rectal sphincters, the symptoms persisting for three months and leading to death. In another patient with general paresis, three

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(8) Amer. Jour. Med. Sci., 1914, Vol. 148, p. 693.

weeks after the sixth intraspinous injection of neosalvarsan, all the injections having been tolerated without great discomfort, an acute ascending paralysis of the Landry type developed, and death supervened. In view of these facts the authors have of late hesitated to urge any form of intraspinous treatment.

The various phases of the reaction of the spinal content prove, if they prove anything, that there is an active specific process going on within the cerebrospinal system. The injection of salvarsanized serum is an ingenious and fascinating proposition for which Swift and Ellis deserve great credit, and yet before accepting this method as one of value in the treatment of syphilis of the nervous system the following points should be considered:

It is of the utmost importance to establish the presence of salvarsan or of free arsenic in the blood of patients treated by intravenous injection in order to determine if the use of the so-called salvarsanized serum is based on rational grounds. It seemed to the authors that blood withdrawn three-quarters of an hour after an intravenous injection would have to depend for whatever efficiency might be attributed to it on the presence of the salvarsan itself, since in the short interval (three-quarters of an hour) elapsing between the injection of the drug and the withdrawal of the blood, the organism could not possibly elaborate any form of protective bodies.

The writers express their indebtedness to Prof. Benedict, of the Cornell Medical School, who made an analysis of ten different specimens of blood which were obtained from fifteen to forty-five minutes after intravenous injection of salvarsan, with a view of determining whether or not arsenic was present in appreciable quantities. He was able to detect only 0.00004 gram to 0.0001 gram of metallic arsenic in 20 c. c. of whole blood.

By a simple calculation they have determined that a man weighing about one hundred and fifty pounds, and having a total blood volume of about eight pounds (one-nineteenth of the total weight), if injected with 0.4 gram of salvarsan would have in every cubic centimeter of his blood immediately after the injection, before elimination or fixation by the body cells began, about 0.0001 gram of salvarsan. This is the maximum amount that Benedict has shown to be present in 20 c. c. of whole blood. Thus it is apparent from the analysis of blood taken within three-quarters of an hour after the injection of salvarsan, that the arsenic is not free in the blood stream, but is probably bound by the receptors of the body cells. Whence it follows that the serum obtained from the blood withdrawn must depend for its efficacy, if it be an all curative, on some other factor, which has as yet not been determined. If this action depends on the presence of antibodies in the blood, it would be much more rational to withdraw the blood a day or more after the intravenous injection.

It can be stated also on the authority of Prof. Benedict that from an analysis of four specimens of spinal fluid withdrawn twenty-four hours after an intravenous injection of salvarsan (0.4 gram) the spinal fluid contains free arsenic in about one-sixth to one-tenth the concentration in the whole blood. This is a striking fact and is contrary to the usual belief that none of the drug administered intravenously finds its way into the spinal canal.

It would seem to be proved then that since the blood serum, which is about one-third the whole blood volume, contains only an infinitesimal trace of arsenic after an intravenous injection of the drug, that the serum as diluted (40 per cent. to 50 per cent.) for intraspinous administration is not truly salvarsanized, and that it contains no more arsenic than does the cerebrospinal fluid after simple intravenous injection. As a matter of fact, the spinal fluid actually contains more arsenic than was found to be present in the "salvarsanized" serum, diluted, as used for intraspinous injection. Evidently the recorded biologic effects of salvarsanized serum must be due to other coincidental factors, possibly to the intravenous injection of salvarsan and the repeated lumbar puncture.

It is of some interest in this connection to note that in one case the injection of non-salvarsanized (normal) serum reduced the cell count from 302 to 32 cells per cubic millimeter, while the Wassermann reaction remained strongly positive from beginning to end. More recently, Dr. Mitchell (in a paper presented before the

American Neurological Association) has shown that a similar reduction can be obtained by lumbar puncture frequently repeated.

The following general conclusions are drawn:

"The most remarkable recent achievements in the treatment of syphilis of the nervous system are due to the possibilities of earlier recognition of all forms of syphilitic disease. Wherever there is a strong suspicion of syphilis, and particularly if there is corroboration of the diagnosis by examination of the blood and of the cerebrospinal content, and even in the absence of such corroboration, most intensive salvarsan treatment should be instituted. Under the ordinary precautions such treatment will do no harm and may be productive of great good. In tabes dorsalis the subjective condition of the patient can be greatly improved and the progress of the disease checked. In all cases of cerebral and cerebrospinal lues the salvarsan treatment combined with mercury accomplishes more than we were able to accomplish by any previous methods. The intravenous injection of salvarsan has been in our opinion the most satisfactory form of treatment. The intraspinous treatment possesses no advantage over the intravenous. We have shown definitely that the 'salvarsanized serum' contains an infinitesimal trace of arsenic and too little to be of any therapeutic value. The spinal fluid contains as much arsenic as does the 'salvarsanized' serum. Up to the present time the results in general paresis have been the least satisfactory, but there is some reason to think that by the more careful elaboration of therapeutic methods more satisfactory results will be within reach."

**Treatment by Intraspinous Injections of Salvarsanized Serum** (Swift-Ellis Method). Considerable work with the Swift-Ellis treatment has been done at the Psychopathic Hospital in Boston (one of the most modern and well-equipped of its kind in the world, and under the able directorship of Dr. E. E. Southard) and is reported by A. Myerson.[9] Eight cases of paretic dementia are reported in detail. They were treated according to the method of Swift and Ellis with the exception that

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(9) Boston Med. and Surg. Jour., 1914, Vol. 170, p. 709.

neosalvarsan instead of old salvarsan was used. The following is the author's summary of the cases, together with his comments:

*Summary of Cases.* Of these eight patients, all undoubted paretics, mostly under forty and only one over fifty, the following has been the fate:

Two died (Nos. 7 and 8 in the series).[1] Of these, one received five doses of intradural therapy, and the other three doses. The course of both was steadily "down hill," and there is nothing in their clinical histories to indicate that their treatment had the slightest effect on the disease. In these two cases it is to be noted that there was no change in the Wassermann reaction.

A third (No. 6 in the series), although not definitely a paretic patient on onset of treatment, and having no definite physical signs during treatment, developed in its course the Argyll-Robertson pupils and differences in his tendon reflexes. The case is a critical one for the therapy because this patient was young, robust and received treatment very early in his disease. Far more important than the fluctuation of the Wassermann reactions in his history is the appearance of these ominous physical changes. They mark a distinct progress in the lesions of paresis. Despite the clearing up of the mental signs, his case can be said to have advanced steadily, despite intensified treatment. Moreover, the disappearance of the mental signs has to be considered more in the light of a remission than as due to treatment. It is to be noted that at the onset of his disease the Wassermann reaction in the spinal fluid was negative. At the present time, it is positive, so that in this respect, too, he is worse than he was. Moreover, the patient, while maintaining a robust appearance, has a pallor which William N. Graves, of St. Louis, describes as cachectic, that is, a sickly look with no apparent loss of hemoglobin. He looks distinctly sicker than on entrance to the hospital and before the beginning of his treatment.

Another patient (No. 2 in the series) was discharged unimproved. He received only three doses of salvarsan-

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(1) Since this paper was written, No. 1 of these cases has died, making a total of three deaths. This is a larger ratio of mortality than is usual in the first year of paresis.

ized serum intradurally, and four doses of salvarsan. His case may be dismissed as being indifferent in its application to the question whether or not salvarsanized serum is of benefit to paresis. It is true that the spinal fluid showed changes, but how far these are related to definite improvement is one of the points at issue.

The fifth patient (No. 5 in the series) showed very definite serologic changes. Wassermann reaction early became negative and remained negative, but it is to be remarked remained negative, although the intradural treatments had been discontinued and only neosalvarsan intravenously administered. There was no definite clinical improvement manifested. Patient said that the pains were less, but as a matter of fact this seems to have been due rather to euphoria than to actual diminution of the symptom, for at different times it was noted that he was suffering from pain. The salvarsan probably caused an enteritis in his case for a bloody diarrhea was noted several times. After the treatment was discontinued the deterioration and downward progress became marked. Nevertheless, the Wassermann reaction in the blood at present is negative.

In a general way what has been said of the above case will apply to the next two cases (No. 1 and No. 4 in the series). In both of these cases the Wassermann reaction was exceedingly variable, in general favorably influenced by the treatment. Moreover, the cell count, the globulin and albumin all were reduced at various times by this treatment. There was, however, no abatement in physical or mental signs. The patients did not look better, feel better or act better. Following the discontinuance of the treatment, the progress downward was marked, showing that the treatment in no wise stopped the disease, although it may have checked it for a time. It would almost seem as if its discontinuance accelerated the normal progress, if such a term can be employed, of the disease. At any rate one cannot claim much for a treatment which when employed as consistently and frequently as in these cases, after it has been discontinued for three months, finds the patients far worse off than when the treatment was initiated.

The last case (No. 3 in the series) has shown what might seem to be the most favorable results of the treatment. A maniacal patient, deluded and hallucinated, all the reactions present in blood and spinal fluid, for a time showed a complete remission, and following the discontinuance of the treatment developed only a few hypochondriacal ideas. Wassermann reaction at the present time is doubtful, cells and globulin almost vanished, albumin greatly reduced. At first glance this would seem to be a splendid recommendation for the treatment, but it is to be noted against this view that the remission started before the treatment was instituted and was almost complete when the first dose of neosalvarsan was administered. In a disease so eminently one of remissions, one must be exceedingly careful in interpreting what one finds as the result of treatment. There are cases on record in the Taunton State Hospital where the remission had lasted two and more years, and undoubtedly such histories can be more than duplicated by any other hospital. Moreover, the patient looks worse than he did when treatment was first started. His color is not so good—it is more yellowish than formerly. He is more listless and despondent.

The following are extracts from the conclusions reached by the author:

"Patients receiving this form of treatment show changes probably as the result of it. These changes are mostly limited to the disappearance of the Wassermann reaction and alterations in chemical-cytologic composition of the spinal fluid. On the whole, no clinical improvement can be recorded which cannot otherwise be accounted for.

"As has been stated in a previous paper, the order of changes is somewhat as follows: The Wassermann reaction seems to be the most variable—the first to disappear, the least stable. The difficulty in evaluating the Wassermann reaction lies mostly in the fact that the results obtained by various laboratories vary according to the ability of the technician and serologist. In the case of these patients, all the work was done in one laboratory, the same method was used throughout, and thus a fairly standard Wassermann reaction can be recorded.

"The cell count seems to have been the next most variable constituent. It seems to be profoundly affected by the treatment, but a reduction must not be taken too optimistically. It will be noted that in the case of H. N. (No. 3 in the series) the cell count was 50 after treatment was discontinued. Later, without treatment, it dropped to 0 for no well-defined reason. Since the examiner was the same in both cases and used the same technique and care, it is probable that the record is faithful to the facts at each time.

"The globulin is perhaps a little less variable than the cell count, that is, it does not diminish so much under treatment, and it rarely completely disappears.

"Finally, it must be stated that the theoretical grounds on which this treatment is based do not seem to be valid. It is assumed that because the Wassermann reaction is most constant an hour after the administration of salvarsan, therefore the blood at that time contains more antibodies. This, of course, is by no means certain, for the meaning of the Wassermann reaction is unknown. Furthermore, it seems to be the opinion, shared by Swift and Ellis, that the nervous system is inaccessible to medicament administered in the usual channels. One hears the term 'inaccessibility of the nervous system' quite frequently, yet a little reflection shows there is no such thing. The effects of opium, chloral, bromide, alcohol, strychnine, and certain of the toxins of infectious diseases seem notably to affect the brain and nervous system, and to do this through the blood stream. The appearance of headache following all kinds of bodily disorders contradicts the assertion of the inaccessibility of the nervous system most emphatically. Further, it is assumed that the introduction of medicament into the cerebrospinal space can affect the brain favorably and locally. Undoubtedly such administration does affect those local conditions, which are largely meningeal, as, for example, cerebrospinal meningitis, cerebrospinal syphilis, gummatous conditions, etc. But in paresis the bulk of the lesions are deep and spirochetes have been discovered only in the cortical substance itself. Now the current of the spinal fluid, if there be a current, is not into the cortical substance or brain tissue. Whatever be the origin of this fluid, whether secreted by the choroid plexus, whether dialyzed from the blood stream as claimed by Metrazat, or the product of the pial endothelium, its direction is from the cortical substance and the brain tissue in general, rather than towards it. So that logically intradural treatment for paresis would fail, and the only reason that the salvarsan does not cure in the case of paresis is because there is either a lack of some intermediary substance to unite it with the spirochete or else because the spirochete has acquired new resistance by reason of its long stay in the body of its host.

"Moreover, despite the discovery of Noguchi, that the *spirochaeta pallida* is present in the brain of paretics it is probable that the sum total of the paretic process is something more than chronic syphilis, or at least a degenerative process has been added, which it is difficult to stay.

"There seems to be another reason for the failure of salvarsanized serum in this treatment. Granted that its theoretical basis be correct, and that the introduction into the intradural spaces can locally and favorably influence general paresis, the amount introduced seems utterly insufficient. Of all the blood in the body, 50 c. c. are removed one hour after salvarsan has been administered. Such an insignificant fraction of the total amount of the blood present can contain only a very small amount of salvarsan. Its introduction seems, *a priori*, to be adding but little of local treatment to that of the salvarsanized blood stream itself.

"However, the treatment merits further trial. It should not be administered to every paretic in the hospital, as some men seem to feel, but should be used in selected groups of cases. It would be very wise not to hold out hopes to the relatives of the patient because the result will probably be disappointment. Experience with this treatment teaches much about paresis and leads to the hope that there is a cure for the disease since we now know that it can be profoundly affected, but as far as my experience goes, the Swift-Ellis method is not the looked-for cure."

**Experiences with the Swift-Ellis Treatment in Munich** are related by Karl Eskuchen.[1] Neosalvarsan was used. There were sixty-eight injections in sixteen cases, namely; nine of tabes, five of paretic dementia and two of cerebrospinal syphilis. Nine of the cases are related in some detail with tabulation of the serologic findings. The author modestly does not consider his material large enough to warrant far-reaching conclusions and merely summarizes his impression as follows:

One case of paretic dementia showed obvious improvement while the others remained unchanged. Subjective tabetic disturbances were considerably improved or disappeared entirely; a severe ataxia became diminished, otherwise no single objective symptom was in any way modified. On the other hand, the disease did not show any progression. Final judgment can only be rendered later and all the patients treated remain under observation.

**Other Experiences with the Swift-Ellis Treatment.** Heine Schrottenbach and Max de Crinis[2] report in detail six cases of paretic dementia treated by the Swift-Ellis method at the Neurological Clinic in Graz (Austria). Their contribution is noteworthy as they made very careful mental and neurologic examination of their patients before, during and after the treatment and demonstrated distinct improvement in both the mental and physical condition. The authors comment on the better results obtained by themselves than by some observers in Germany, particularly by Eskuchen and think this may possibly be ascribed to the fact that they used the old salvarsan while Eskuchen used neosalvarsan. Another possible reason for their success is seen in the fact that they combined the salvarsan treatment with inunctions of calomel ointment. They varied the proportion between serum and salt solution in the intraspinal injections considerably but in most cases they used from 25 to 30 c. c of a 50 per cent. serum. Severe reactions were not observed. Four of the six patients treated showed decided improvement in every respect, including the laboratory

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(1) Münch. med. Wochenschr., April 7, 1914.

(2) Zeitschr. f. d. gesamte Neurol. u. Psychiat., 1914, Vol. 25, p. 392.

tests. The other two were more advanced and showed no improvement. The improvement in speech was particularly striking, much greater than ever observed by the authors with any other form of treatment. In two cases the reaction of the pupils returned to normal (previously sluggish but not lost). In the psychic sphere they noted particularly decided improvement in grasp and memory and in capacity for calculation.

William H. Hough[3] of the Government Hospital for the Insane at Washington reports thirty-six injections in six cases and is quite optimistic as to the possibilities, having seen pronounced improvement both in clinical symptoms and particularly in the laboratory tests. In his study of the cerebrospinal fluid in 240 cases of paretic dementia reported elsewhere[4] and in which many kinds of treatment had been used he has never seen such marked improvement in the reactions as occurred under the intraspinous injection.

G. W. McCaskey[5] in two articles describes the technique in detail and concludes that this treatment is preferable to the direct injection of neosalvarsan into the spinal canal as practiced by Ravaut. His remarks on the best time for withdrawal of blood after the intravenous injection are of particular interest:

"According to the technique of Swift and Ellis, the blood is withdrawn one hour after the intravenous injection of neosalvarsan. If the purpose of the treatment is, either in whole or in part, the introduction of neosalvarsan into the spinal canal, such a delay appears objectionable, unless demanded by other considerations. Wechselmann says that the Abelin reaction for salvarsan disappears in some cases in one hour. The amount of salvarsan in the blood undoubtedly diminishes rapidly from the moment of its injection. Of this fact, which could have been predicted confidently on purely biologic ground, I have fully satisfied myself by testing the blood at different intervals after the injection of the neosalvarsan.

"In regard to the intraspinal dosage of neosalvarsan by the Swift and Ellis technic, what are the facts so far

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(3) Jour. Amer. Med. Ass'n., Jan. 17, 1914.

(4) Rev. of Neurol. and Psychiat., August, 1913, p. 411.

(5) Jour. Amer. Med. Ass'n., Jan. 17, 1914; and May, 30, 1914.

as these can be predicated? A full conventional intravenous dose of neosalvarsan contains 900 mg. The average human body is said by physiologists to contain about 3,000 c.c. of blood. A very simple calculation will show us that if this entire quantity of neosalvarsan is evenly distributed in the blood, each 12 c.c. of serum (the amount advised by Swift and Ellis) cannot contain more than $^1/_{250}$ of the entire dose, or 3.75 mg. Of course, in a very few minutes it will be much less, and continue to diminish until at the end of one hour it may not be detectable by the most delicate test.

"In an effort to increase the intraspinal dose of neosalvarsan, I have gradually and cautiously shortened the time until now the usual routine is about twenty minutes after the completion of the intravenous injection. In order to secure more rapid uniform diffusion through the circulating blood, the neosalvarsan is injected very slowly, over a period of seven or eight minutes—the approximate time for the complete circulation of the blood. This insures a preliminary mechanical mixture or a general distribution throughout the blood mass, which would not occur if it were injected in one or two minutes. In fifteen or twenty minutes from the completion of the injection, I believe the uniform diffusion may be confidently assumed, and, as any one can easily satisfy himself by the Abelin test, the quantity of neosalvarsan in the blood at this time is several times greater than at the end of an hour.

"There has not been, so far as I can determine, any more pain following the intraspinal injection of serum obtained in twenty minutes than with that obtained one hour after the intravenous injection of neosalvarsan. As a general rule, there is no pain of consequence following the intraspinal injection. Occasionally, immediately or even after from six to ten hours moderately severe pain may rather suddenly develop in back and limbs, lasting several hours. There has been no increase in the incidence or severity of this pain since shortening the interval between the intravenous injection and the bleeding.

"Much of its therapeutic efficacy, however, may be attributed to the serum *per se* independently of its salvarsan content; the latter is after all the known specific spirocheticide, and I cannot avoid the conclusion that an intraspinal dose of serum containing perhaps between 2 and 3 mg. of neosalvarsan offers more therapeutic promise than one from which it has so completely disappeared as to be no longer demonstrable. I have, therefore, adopted, and advise a twenty-minute interval as above outlined.''

**Intraspinal Injection of Neosalvarsan Dissolved in Distilled Water.** The early work of Ravaut was briefly mentioned in the Practical Medicine Series, 1913, vol. 10, p. 77. In this country U. J. Wile[6] reports twenty-five injections given to fifteen different patients as follows: tabes dorsalis, seven; general paresis, three; cerebrospinal syphilis, three; tabo-paresis, two. The technique is as follows:

''The solution used for injection consists of a 6 per cent. solution of neosalvarsan in distilled water. This solution is hypertonic and made of such a concentration that each minim must contain 3 mg. of the drug. The dosage injected is from 3 to 12 mg.—that is, from 1 to 4 drops of the solution, which is made up as follows:

''An ampule containing 0.3 gm. of neosalvarsan is dissolved in 5 c.c. of freshly distilled water. If the ampule contains 0.6 gm., 10 c.c. of water are used. In both solutions, each drop will contain 3 mg. of the drug. The syringe employed for the injection is accurately graduated in drops. The patient is placed in a position for lumbar puncture, either sitting or lying, according to the choice of the operator. The puncture is then made with a needle, the end of which fits the graduated syringe. After a few drops of the spinal fluid have flowed out of the cannula, or a greater quantity if a diagnostic puncture is desired at this time, the syringe is fitted into the needle, and the fluid is allowed to run back into the syringe barrel, thus mixing with the amount of the drug in the barrel. The mixed spinal fluid and drug are then gently forced into the canal, and slight suction is made on the syringe to withdraw a second amount of fluid which washes out the needle.

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(6) Jour. Amer. Med. Ass'n., April 11, 1914; and July 11, 1914.

This is then reintroduced, the needle is quickly withdrawn and the patient placed in the Trendelenburg position, in which position he is allowed to remain for at least one hour."

The results obtained are very similar to those recorded by other investigators using any of the modern methods of treating syphilis of the nervous system:

"Of the fifteen patients thus treated, two are dead; seven are markedly improved, both subjectively and in the objective findings in the cerebrospinal fluid; three patients having general paresis were given only a single injection and showed no improvement, nor were they made any worse by the treatment; one patient showed an improvement after a single injection with a relapse of symptoms, and no subsequent treatment was given; and one patient was markedly improved with respect to the oculomotor palsy, but showed progression of the spinal feature of the disease in a progressive paraplegia."

**Unfavorable Effects of Intraspinous Injections of Neosalvarsan by Ravaut's Method** are reported by two men who have employed both this method and that of Swift and Ellis and consider the latter preferable. B. C. Corbus[7] injected 2 mg. of neosalvarsan in distilled water intraspinously in a case of syphilis with cerebrospinal fluid involvement without symptoms. Paralysis of the bladder set in and persisted after six weeks.

[In a personal communication on November 22, Dr. Corbus states that this bladder condition cleared up completely; further that the first two cases of tabes mentioned as having showed increase in ataxia and numbness also developed urinary retention after the Ravaut treatment and that one patient died and the other is in a low condition.—Ed.]

Alfred Gordon,[8] stimulated by the reports of Ravaut and Wile, applied their method in a tabetic 35 years old. Prior to injection the patient had complained of pain in the legs, ataxia and urinary incontinence, all of which symptoms had been greatly lessened by one injection of salvarsanized serum. Following the direct injection of 6 mg. of neosalvarsan the patient developed

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(7) Jour. Amer. Med. Ass'n., August 15, 1914.
(8) Jour. Amer. Med. Ass'n., November 21, 1914.

severe pain in the legs within half an hour, vomited repeatedly for six consecutive days, developed retention of urine and incontinence of feces. On the fifth day small erythematous patches appeared on the genitalia and sacrum and later became gangrenous. The patient grew worse and finally died. Gordon warns against this method and states that up to the time of writing the Swift-Ellis method has given him far more satisfactory results than any other old or newer method.

**Intraspinous Injections of Neosalvarsan Dissolved in Inactivated Blood Serum.** Marinesco and Minea[9] claim that experiments performed by themselves and Stanesco have shown that solutions of a few milligrams of neosalvarsan in heated blood serum have greater inhibitive action on the *spirochaeta pallida* than serum which has been salvarsanized *in vivo* as by the Swift-Ellis method. They have treated by this method nineteen cases of syphilitic disease of the nervous system, fifteen being cases of tabes. Seven tabetics had four injections each of serum containing 6, 9, 10 and 12 mg. of neosalvarsan, the injections being given five or six days apart. Four tabetics had three injections, two had two injections and two had a single injection. Two of the tabetics had increased sphincter disturbance after the treatment; otherwise there were no severe reactions, but many of the patients had chilly sensations and pain in the legs after the injections. Some of the tabetics benefited by the new treatment. Thus in two cases of Charcot joint of the knees the swelling became reduced and there was some improvement in the vibration sense in the vicinity of the joint. In five other cases there was improvement in the gait, sphincter disturbance and sensation. The state of the reflexes was not changed. In six cases there was no improvement. The authors believe that the results by this method are somewhat better than by mercurial injections or by merely intravenous injections of neosalvarsan. However, they admit that they have observed their patients only from three to six weeks after the treatment.

**Injections of Neosalvarsan Dissolved in Serum Into the Subdural Space of the Brain.** Marinesco and

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(9) Rev. Neurol., March 15, 1914.

Minea[1] made these injections in nineteen cases of paretic dementia. The first two patients received 20 milligrams of neosalvarsan dissolved in 2 c.c. of the patient's serum. Before injection the serum had been inactivated and the mixture of serum and neosalvarsan had been kept at 37° C. for from one-half to three-quarters of an hour before injection. Both of these patients were injected on one side of the head only and both had an epileptiform convulsion soon after the injection and both failed to show any subsequent improvement. The other seventeen patients were injected on both sides of the head, 8 cm. behind the border of the orbit. Three of these patients had epileptiform attacks after the treatment. Thirteen patients received 10 mg. of neosalvarsan in 4 c.c. of serum on each side and four of them after a month showed a certain amount of mental improvement, ascertained by careful intelligence tests such as calculations. In one case, 95 mg. of neosalvarsan were injected without any severe reaction. The authors believe that the most rational treatment is a combination of intravenous, spinal and cerebral injections of neosalvarsan so as to attack the *Spirochaeta pallida* in all situations.

**Intracranial Injections of Neosalvarsan Dissolved in Spinal Fluid.** Ralph C. Hamill[2] reports two cases of paretic dementia treated by intracranial injections of neosalvarsan through drill holes in the skull. He uses a drill having 1,750 revolutions a minute so the puncture is made "with practically no expression of pain by the patient." The punctures were made at symmetrical points 8 cm. above the orbital arch and 2.5 cm. from the median line. The first patient entered the hospital on June 12, 1914, with a history of unsteady gait for seven months, pains in the legs, and slight incontinence of urine. He had Argyll-Robertson pupil, marked Romberg sign, loss of tendon reflexes, extensive analgesia and was extremely dull mentally. The spinal fluid gave a position globulin test and contained 24 cells per cubic millimeter. Five days after admittance to the hospital he had three typical epileptiform convulsions. On July 8,

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(1) Rev. Neurol., March 15, 1914.

(2) Paper read in October, 1914, before the West Side Branch of Chicago Med. Soc., to be published in Illinois Medical Journal.

lumbar puncture was made and 6 c.c. of spinal fluid removed. Then 100 mg. (.1 gm.) were dissolved in 5 c.c. of the spinal fluid and injected in equal quantities into drill holes in the skull, made as described above. Fourteen hours later he became restless and resistive and after 24 hours the temperature was 104°, pulse 136, respirations 36. Three days after the injection temperature, pulse and respirations were normal. Twenty-three days after the injection the patient had two convulsions similar to those already recorded. At the time of writing, in October, his condition was similar to that on entrance.

The second patient, a man 33 years old, was admitted to the hospital on May 25, 1914. Three months previously his illness had commenced with tremor of the hands and lips and a halting speech. His gait became unsteady and vision had been failing for two months. There was a history of syphilis 10 years before. On examination he showed a very marked tremor around the mouth, the pupils reacted normally but ophthalmoscopic examination revealed primary optic atrophy. The tendon reflexes were increased. Ankle clonus was present on both sides but the plantar reflexes were normal. The spinal fluid contained 100 cells per cubic millimeter and gave a positive globulin test. Another lumbar puncture on April 28 yielded a fluid with 80 cells per cu. mm., and on May 19, 10 cells. On the last named date, 3 mg. of neosalvarsan were injected by lumbar puncture and this was repeated on June 5, when the cell count was 26. From June 15 to July 10, the patient's condition rapidly grew worse. Several times he tore his restraint and tried to run away in his bed garments. His gait and station also rapidly became worse so that early in July he frequently fell in attempting to walk across the ward. On July 10, he received 100 mg. of neosalvarsan dissolved in 5 c.c. of spinal fluid, by subdural injection into drill holes in the frontal bone. Four hours after the injection he vomited; twelve hours later the rectal temperature was 102° F. Five hours after the injection, increased difficulty in speech appeared and after forty-eight hours the right hand became paralyzed. Three days after injection there was also paralysis of the right lower face and partial paralysis of the right leg. The next day there were convulsive twitchings of the right side of the face and of the right arm and the leg became very rigid. The pupils were fixed and for half an hour the patient did not respond when spoken to. Thirty-six hours later a similar convulsive seizure took place. After three weeks the right-sided paralysis had entirely disappeared. His gait was decidedly better than before the intracranial treatment. His mentality had greatly improved so he was able to help the nurses in their work. On October 9, lumbar puncture was made and 12 c.c. of fluid withdrawn; 7 c.c. were used for examination, the other 5 c.c. were mixed with 1 c.c. of distilled water which contained 50 mg. of neosalvarsan. No electric drill being available, the patient was given gas, but, as he became cyanotic, the anesthetic was discontinued. On the left side the opening was made without discomfort as the previous hole was discovered, but on the right side a new one had to be made. The solution mentioned. containing 50 mg. of neosalvarsan was equally divided between the two sides. For twenty-four hours following this last injection the patient seemed fairly well though toward the end of this period he became slightly stupid and apathetic. During the following week he had, on an average, one slight convulsion a day and was in an apathetic state, only answering in monosyllables. From that time on, however, up to the time of writing, he gradually improved.

## SURGICAL TREATMENT.

**Gastric Crises and Vagotomy.** The exact mechanism of the gastric crises in tabes is not yet fully understood but new light on the problem is being shed by surgeons who for some years past have been engaged in devising operations consisting in the cutting of nerves thought to be the principal paths of the abnormal irritation. Best known is the Foerster operation of cutting the lower thoracic posterior roots within the dura mater of the cord. The occasional failure of relief from this procedure led to a closer study of the character of the crisis for the purpose of determining the type of attack which is relieved by root resection and to discover other means of combatting those forms of gastric crisis not amenable to such resection. A few years ago, Exner of Vienna recommended section of the vagus nerves for certain types of gastric crisis and this year Exner and Schwarzmann[3] contribute a thorough discussion of the subject with analysis of twenty cases treated by vagotomy and a comparison with the results in 145 cases treated by Foerster's operation. The authors first discuss the prevalent views of the mechanism of gastric crisis and the nerve supply of the stomach. As to the latter it is stated that the motor supply is chiefly from the vagi while sensation is partly conducted through the vagus, partly through the sympathetic, the relative importance of the two sensory supplies varying greatly in different individuals. The authors maintain that affections of the vagus may cause changes in the gastric mucosa, such as ulcer. In six cases of gastric crises in which the abdomen was open, they found gastric ulcer. In seventy-five cases of tabes which came to necropsy at the Vienna Pathological Institute, gastric ulcer was found five times and carcinoma of the stomach three times. The clinical histories of these cases show that four of the ulcer cases and all of the carcinoma cases had shown typical gastric crises. The authors believe that this high percentage of ulcer may be explained by degenerative changes in the vagus nerves in tabes as they found marked degeneration in the portions of the vagi which were resected in their own operative cases. As early as 1876, Tolot and Fromont reported changes in the vagi in cases of gastric ulcer in tabetic subjects and similar changes in the vagi have been observed in connection with laryngeal crises. In their investigation of vagotomy Eppinger and Hess were impressed by the similarity of gastric crises and the effects of experimental irritation of the autonomic nervous system. Thus in gastric crisis it is not uncommon to have salivation, excessive perspiration, dilitation of the pupils at the beginning of the attack and associated laryngeal crises. The injection of $\frac{1}{6}$ grain of pilocarpine would sometimes bring on a mild form of

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(3) Mitt. a. d. Grenzgeb. d. Med. u. Chir., 1914, Vol. 28, p. 15.

gastric crisis while injection of atropine sometimes relieved the attacks. In 1900, Roux described degeneration of the fine medullated fibers passing from the posterior roots to the sympathetic ganglia, and in 1902, Foerster published his extremely interesting clinical studies. He assumed the existence of hyperesthesia of the gastric mucous membrane in cases of gastric crisis as in tabes he often found hyperesthesia of the corresponding Head's zone.

He reduces the gastric crises to the following components: (1) increased sensory irritation in the form of pain or specific organ secretion; (2) signs of motor irritation; and (3) signs of secretory irritation. The latter two components he considers secondary to the sensory irritation which he believes comes through the seventh, eighth and ninth thoracic posterior roots. However, Foerster considers it possible that crises may result from irritation of sensory fibers passing in the vagus, in which case one would theoretically expect hyperesthesia of the temporal and parietal zones of Head. In fact, Foerster frequently had heard complaints of headache on the part of patients with gastric crises.

The first operative treatment of gastric crises was devised in 1899 by Jaboulay, who stretched the solar plexus and claimed good results in two cases, but others met with failure. Foerster's operation has been in vogue since 1909, and at first consisted in the resection of the seventh, eighth and ninth thoracic posterior roots, but later Foerster demanded the resection of the posterior roots from the third thoracic to the second lumbar. The present authors tabulate the available statistics of this operation (Lotheissen with thirty-nine cases, Foerster with forty-four cases and Cade and Leriche with sixty-two cases) and find the mortality ten to fifteen per cent. and the percentage of improvement from 45 to 48. Foerster himself admits five deaths, sixteen recurrences and three unimproved in his forty-four cases, leaving twenty cases with permanent improvement.

On account of the danger of laying open the dural sac for a long distance, Gulecke has recommended cutting the roots outside of the dura and reports five patients operated on in this manner. One of the patients died and in the other four the relief was only partial. Franke's operation avoids the opening of the spinal canal altogether as he merely resects the intercortal nerves, from the sixth to the tenth, close to their exit from the intervertebral foramina. A few observers have had success with the Franke operation while others report failures and fatalities. Schüller has proposed to replace or supplement the Foerster posterior root-resection by the cutting of the antero-lateral columns of the cord through which pain sense is conducted upward.

Exner's operation consists in bilateral subdiaphragmatic resection of the vagus nerves associated with gastro-enterostomy on account of the tendency to gastric atony after the nerve resection. In the present paper fourteen cases in which the patients were so operated on by Exner are related in detail and the results in these cases and in six similar operations by other surgeons are tabulated. Of the twenty patients, ten were relieved of the crises, two improved, three were unchanged, one grew worse, one died, and three have not been under sufficiently long observation to warrant any conclusion as to the effect of the operation.

As stated in the beginning of this review it would appear that the mechanism of the crises may vary in different cases and in order to determine which operation to select in a given case Fritz König[4] has proposed to anesthetize the posterior root region with novocaine injections and if this procedure is successful in relieving the attack root resection would be the logical operation to perform. The novocaine solution is injected by means of long needles in the region of the costo-vertebral articulations from the sixth to the ninth ribs, one or two fingers' breadth from the median line. The needle is guided so as to follow the subcortal groove toward the foramen. Heile[5] has further elaborated this procedure and the present authors agree with him that it should be instituted before a radical operation is performed. They also recommend taking advantage of the observations of Eppinger and Hess and ascertain whether injection of gr. $\frac{1}{8}$ of pilocarpine will produce a gastric crisis, and if

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(4) Med. Klinik, 1911.
(5) Münch. med. Wochenschr., 1911, No. 39.

so, further ascertain whether atropine may have a favorable effect, both of these drug actions indicating a vagal origin of the crises in the given case.

## DISEASES OF THE BRAIN.

### APRAXIA AND APHASIA.

**Apraxia in Relation to Aphasia.** This subject is discussed by John H. W. Rhein.[1] Apraxia is an inability to perform purposeful movements while at the same time the object and its use are recognized and the limbs can be readily moved, in other words, are not paralyzed. It is usually unilateral, affects simple movements, interferes with imitation of movements and gives rise to amorphous instead of purposeful movements. There is recognized also an ideatory apraxia which affects mainly the manipulation of objects, for example, a cigar is rubbed against the match box instead of the match, in an effort to light the cigar. As may be expected, apraxia is frequently accompanied by aphasia as the two are closely related. In fact motor aphasia has been called apraxia of the speech muscles and Liepmann, the greatest investigator in this field, has said that in a broad sense expressive aphasia is apraxia consisting of an inability to utter the words though the tongue, palate, mouth and vocal cord musculature is intact. In motor aphasia there is an inability to use the tongue, lips, soft palate and vocal cords though these muscles are not paralyzed. The muscles can be moved but the subject can not awaken the proper movement memory to produce speech. In apraxia there is an inability to use the arm for purposeful movements yet there is complete power to move the arm muscles. The anatomic lesions responsible for apraxia are found in regions close to those associated with speech. The supramarginal gyrus, the frontal lobe and the corpus callosum are the most frequent sites of the lesion.

Marie expressed the view that apraxia is the result of an intellectual deficit, and that apraxia is really an aphasia of feeble intensity. He believed that the order

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(1) New York Med. Jour., May 16, 1914.

is not understood, nor does the patient have an exact idea of the gesture which corresponds to the given order. On the other hand, according to Liepmann, the mental deficit is the result of the lesion causing the apraxia and not the cause itself.

Rhein's view is that a certain degree of intellectual deficit exists in these cases. The patient does not always recognize the incorrect result, in fact, believes that he is performing the act properly, when in reality he is apractic in his movements. This may be purely a psychic deficit or it may be agnosia or, what is more likely, a combination of the two.

## AFFECTIONS OF THE BLOOD VESSELS.

**Aneurysms of the Vessels of the Brain.** John H. W. Rhein[2] gives a brief and clear review of the literature and reports a case with necropsy. He points out that in a number of cases cerebral aneurysm was an accidental necropsy finding, no symptoms having existed during life. In a second group, an apoplectic stroke is the first symptom, while in the third group an apoplectic stroke has been preceded by symptoms of brain tumor. Finally, in the fourth group, there are only the symptoms of brain tumor. In 555 cases collected by Beadles[3] ninety-two cases had presented no symptoms. In 46 per cent. of the cases the symptoms were those of apoplexy, in 20 per cent. tumor symptoms preceded a fatal apoplectic stroke, and in 16 per cent. the symptoms were those of brain tumor. The situation of the aneurysm has a greater bearing on the symptomatology than its size, and secondary lesions such as hemorrhage or thrombosis with softening may complicate the picture. Absence of symptoms has most frequently been recorded in aneurysms of the middle cerebral and the basilar arteries, but with the former site, aphasia and hemiplegia often occur, while paraplegia has been caused by basilar aneurysm. Aneurysm of the posterior communicating artery may cause oculomotor paralysis and pressure on the optic tracts. Contrary to expectation the occurrence of a

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(2) Jour. Nerv. and Ment. Dis., 1914, Vol. 41, p. 360.
(3) Brain, 1907, p. 285.

bruit is rare and is not considered a reliable sign as Bruns has pointed out that it may also be caused by chlorosis, sinus disease and thrombosis. Rupture of the aneurysm is a frequent event, having occurred in 339 of the 555 cases collected by Beadles. According to Gowers, the order of frequency of involvement of the various cerebral vessels is as follows: (1) middle cerebral; (2) basilar; (3) internal carotid; (4) artery of corpus callosum; (5) posterior communicating; (6) anterior communicating; (7) vertebral; (8) posterior cerebral; (9) inferior cerebellar.

The case reported by Rhein is that of a man of 57 who came to the hospital in June, 1908, on account of loss of power in both legs. The left arm and leg had suddenly become slightly weak following a stroke in 1906. The weakness gradually progressed so that two months before his death, in 1911, he became unable to walk even with crutches. The arms also gradually became weak and spastic. In the last few months of his life there was occasional urinary incontinence. The case was an extremely complicated one as the necropsy revealed three distinct pathologic conditions. In the first place, there was an aneurysm of the size of a small pigeon's egg at the anterior portion of the basilar artery, at the point where this artery divides into the posterior cerebral arteries. Secondly, there was a hypernephroma of the right kidney with metastases in the left lung and, finally, on microscopic examination there was round-celled infiltration of the pia of the pons, one-half inch below the seat of the aneurysm and also round-celled infiltration in the paracentral region of the cortex. On account of the location of the secondary degenerations it was concluded that the paralysis had been caused by the chronic inflammation, probably of syphilitic nature in the pons, and that the aneurysm itself had not been responsible for any of the symptoms.

**Bilateral Symmetrical Petechial Hemorrhages of the Brain After Injection of Neosalvarsan.** Fred D. Weidman[4] reports an unusual occurrence following the second intravenous injection of neosalvarsan administered to a man 41 years old of admitted alcoholic habits. He had given a positive Wassermann test and after the first dose showed no unfavorable symptom. The second dose was given eight days later and like the first one was .09 gm. The next day the patient became dazed and attempted to get out of bed at night. On the second day, he became irrational and developed spasticity of the lower extremities and incontinence of urine. He soon became unconscious and had two general convulsions. There was no vomiting. The urine contained a little albumin and on the fourth day there was retention. On this day the man also developed dry rales over both lungs. He died on the fifth day.

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[4] Jour. Nerv. and Ment. Dis., 1914, Vol. 41, p. 384.

Necropsy findings: Incipient broncho-pneumonia of left lung; brown atrophy of heart succeeding hypertrophy; diffuse fibrous aortic valvulitis; chronic passive congestion of liver and kidneys; miliary hemorrhages and follicular hyperplasia of the spleen; edema and multiple petechial bilateral symmetrical hemorrhages of the brain; arteriosclerosis. In addition, on histologic examination, acute nephritis of capillary and tubular type was found.

The brain is described as follows: "It is large and slightly softer than normal. Under the pia there is a moderate excess of clear fluid. Its vessels are congested but no hemorrhages are noted. Upon incising the hemispheres many punctate and linear hemorrhages are found in the white matter. They lie for the most part in the anterior limbs and genu of the internal capsule of both sides but a few extend into the lenticular nucleus and the corona radiata. Their microscopic appearance varies. Sometimes a central capillary is surrounded by red blood cells, or again, it may be surrounded by a ring of necrotic tissue succeeded by a zone of erythrocytes. Often the capillary may not be seen in a given section, but in others (cut serially) it will appear in the continuation of the same hemorrhage. Its position may in other cases be indicated by a clump of hyaline material. Occasionally, a few leukocytes and a little fibrin will appear in the peripheries of some of the hemorrhages. Where the lesion extends into the grey matter the hyaline thrombosis of vessels is clear, and now the nearby brain tissue is necrotic, this including the nerve cells themselves. The cortex contains no hemorrhages. The pia is edematous and contains diffuse collections of erythrocytes. Treponemata were not discernable in the lesions when stained by Levaditi's method. Scrapings from the linings of the cerebral arteries showed intracellular endothelial fat by Soudan III. The subject was arteriosclerotic.

In the author's opinion this is a case of arsenical poisoning and he gives six literature references to cases of hemorrhagic encephalitis following salvarsan injections and one to a case following injection of neosalvarsan.

**Occlusion of the Posterior Inferior Cerebellar Artery.** Andrew C. Gillis[5] gives a clear description of the rather definite symptoms produced by this lesion and reports two cases. The posterior inferior cerebellar artery is usually described as the largest branch of the vertebral artery and its course as passing obliquely backward around the medulla oblongata, at first between the roots of the hypoglossal nerve then between the roots of the accessory and the vagus nerves to end on the inferior surface of the cerebellum. Previous anatomic study has shown that the lesion in the medulla extends laterally from the restiform body to the inferior olive and vertically from where the restiform body passes into the cerebellum to about the middle of the hypoglossal nucleus. The structures usually involved are the descending root of the fifth nerve, the nucleus ambiguous, the glossopharyngeal and vagus nuclei and the ventral and dorsal spino-cerebellar tracts.

According to Gillis the symptom complex produced by occlusion of this artery is as follows:

"Sudden onset with giddiness and marked tendency to fall on the affected side; no loss of consciousness; difficulty with swallowing and occasionally with phonation; loss of appreciation of pain, heat and cold over part or the whole of the trigeminal area on one side of the face (usually the side of the lesion) and a corresponding loss of pain and temperature sense over the opposite side of the body from the face down; touch, tactile discrimination, deep pressure and muscular sense are intact; paralysis of the sympathetic on the side of the lesion causing retraction of the eyeball, contraction of the pupil

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(5) Jour. Amer. Med. Ass'n., October 31, 1914.

and drooping of the eyelid; ataxia of the arm and leg usually on the side of the lesion. In the course of from two to six months practically all symptoms disappear, other than the sensory changes which usually are permanent.

Case 1. A married woman 40 years old was first seen on October 6, 1913. Three days previously she suddenly became giddy and found that on attempting to walk there was a tendency to go to the right side. This did not trouble her much but 30 hours later she had a sudden sharp pain on the right side of the forehead which lasted for an hour and was followed by numbness of the upper part of the right side of the face. The following afternoon (October 4) she had an attack of vomiting. When examination on October 6, she presented the following condition: The right eye was slightly retracted, the pupil small; slight drooping of the eyelid. Both pupils reacted to light and distance. The right did not dilate so readily as the left when the skin of the neck was irritated. There was no nystagmus. Sight, hearing, taste and smell were normal. No weakness of the muscles of the face, pharynx or larynx was noticeable nor was there any difficulty in swallowing nor any disturbance of voice. There was a marked tendency to fall to the right side when the patient attempted to sit up in bed, and it was impossible for her to stand on account of this condition. The patellar and achilles reflexes were somewhat more marked on the right side than on the left. The arm reflexes were equal on both sides. The plantar reflex was normal on both sides.

Sensory disturbances: The patient complained of slight numbness over the right side of the face and the left side of the body from the nipple down; the right eye felt peculiar, the right nostril as if it were swollen. Touch, tested with cotton-wool, was perfect over the entire body. Tactile discrimination, tested by means of the compasses, showed no difference between one side of the body and the other. The conjunctiva and cornea of the right eye were insensitive to the touch of cotton-wool. The right nostril was not so sensitive as the left. Deep pressure sense was normal on both sides.

Muscular sense: The patient could appreciate all movements either of arm or leg on either side of the body. Recognition of weight, size, shape and form was normal.

Pain sense: There was absolute loss of cutaneous pain sense over the upper part of the right side of the face, comparing roughly with the distribution of the first and second branches of the trigeminus nerve. There was also total loss of pain sense over the left side of the body below the nipple line, or about from below the distribution of the fourth spinal root segment.

Temperature sense: There was loss of appreciation of heat and cold over the same area as that of loss of pain.

There was no change in the patient's condition until ten days later when pin pricks of the left leg produced a disagreeable tingling sensation. In the course of a couple of weeks the entire affected area on the left side behaved similarly. When the patient went home on November 30, there was no change in the sensory symptoms, with the exception that the disagreeable, tingling feeling was not so marked. The right pupil was of about normal size but there was still some drooping of the eyelid and retraction of the eyeball. The patient could walk fairly well. When again seen, in July, 1914, her condition remained practically the same. The author believes that the occlusion of the artery was probably due to thrombosis. The Wassermann test was negative, and there was no signs of arteriosclerosis except persistently high blood-pressure.

The report of the second case is also a purely clinical one. The vascular disease here probably was syphilitic.

**Plugging of Cerebral Vessels with Plasmodium Malariae in a Case of Malarial Coma with Sudden Death** is reported by Ludwig A. Emge.[6] An old man was found unconscious in a Chicago street and taken to a nearby hospital. He developed high fever and convulsions and died in coma after forty-eight hours. The leukocyte count was 19,600. The urine was normal. He remained unconscious until death and no history was obtainable. The chief gross findings at the necropsy consisted of enlargement of the spleen which weighed 440 grams and of the solitary lymph nodes of the intestines, a peculiar bluish-grey pigmentation of the surfaces of the brain and

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(6) Trans. Chicago Path. Soc., June, 1914, Vol. 9, p. 133.

intestine and of the liver substance and a generalized slight icterus. Malaria was suspected on account of the color of the liver and brain and on account of the absence of evidence of any other infection to account for the changes, especially the enlarged spleen. Histologic examination shows that the tissues of the brain were not changed except in the cortex where there were multiple, small, well-defined, circular regions of necrosis which almost invariably surrounded a capillary tightly filled with parasites (see Plate I). Otherwise the tissues stained well with all of the stains employed. All of the capillaries of the white as well as the grey matter contained numerous young parasites, many of which were within red cells. The massing of red cells free and infected together with the free parasites gave to the capillaries a thrombosed appearance but no actual fibrin formation could be demonstrated. The great abundance of parasites in the brain capillaries was in marked contrast with those of other organs. The endothelial cells lining those capillaries were greatly swollen and stained very deeply. Leukocytes were practically absent. There were a few endothelial phagocytes present in the circulation. They were usually much swollen and heavily pigmented.

Plasmodia were also found in liver, spleen, lung, kidney, thyroid and myocardium.

In Ewing's[7] contribution to the pathologic anatomy of malarial fevers the comatose type of "pernicious malaria" is divided into three pathologically and clinically distinct varieties: one due to the massing of young ameboid parasites in the cerebral arteries, another to the embolic processes with temporary occlusion of the vessels in the small areas of the brain, and without uniform massing of parasites in the cerebral capillaries, and the third to the general toxemia of the infection. In the first of these, the coma is rather slowly established in the course of the infection which is apparently connected with increase in size of the parasite and gradual filling of the vessels with thrombi of infected red cells, pigmented leukocytes and endothelial cells. Many young parasites are found in the peripheral blood, the tempera-

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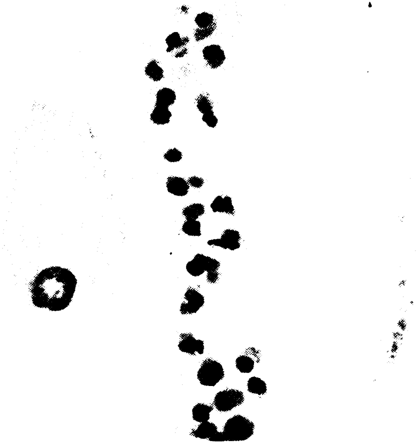
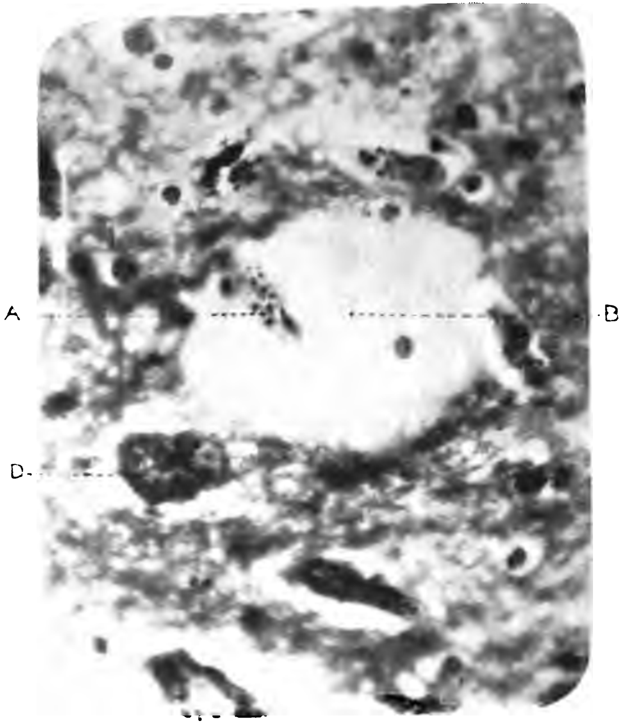
(7) Jour. Exp. Med., Vol. 6.

## PLATE I.



Young free estivo-autumnal malarial parasites in a brain capillary.



Small vessels of the brain blocked by plasmodia and pigment and surrounded by areas of necrosis.—Ludwig A. Emge (page 61).

ture is elevated, the reflexes absent and the patient passes usually from delirium into coma. Death occurs about forty-eight hours after the onset of the cerebral symptoms. In the second variety, coma develops suddenly and may be as promptly recovered from. It is seldom fatal. There are extensive malarial lesions in the viscera, but few or no parasites in the brain. The distribution of parasites is otherwise uniform. In the third form, coma develops slowly, except in cachetic cases, and is prolonged not being caused by massing of young parasites in the cerebral vessels. It is nearly always fatal.

## BRAIN TUMOR.

**Some Causes of Disappointment in Operations on Brain Tumor.** William G. Spiller[8] read a paper with this title before the New York Neurological Society. The paper and the discussion give a vivid picture of the present status of the surgery of brain tumor. The following is the official abstract of the proceedings:

Dr. Spiller said that the discussion on brain tumor introduced by Bruns and Tooth at the recent International Congress in London called forth some discouraging statements. Bruns said that about thirty out of 100 brain tumors were so situated that a radical operation might be advised; the localization was accurate, and the tumor in these cases was accessible. He believed that we might expect surgical success in from 3 to 4 per cent. of all brain tumors. Tooth studied the records of 500 cases of brain tumor at the National Hospital obtained during the years 1902 to 1911, inclusive. Of these, about half came to operation. He thought a high mortality was inevitable, but that it could be reduced by a judicious choice of cases and by selection of the operation best suited for individual cases. The immediate dangers common to all growths, all situations and apparently all operations were shock, collapse and respiratory and cardiac failure.

Dr. Spiller said that many causes of disappointment would occur to any one familiar with operations for brain tumor. The best known are incorrect diagnosis; the

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(8) Jour. Nerv. and Ment. Dis., 1914, Vol. 41, p. 184.

infiltrating character, large size and inaccessible situation of the tumor, errors in technique and impaired general vitality. The speaker said he desired in this communication to speak of the enlargement of the brain associated with tumor, the distortion of the brain, especially from tumor in the posterior cranial fossa, and the acute swelling of the brain, which was probably an important element in the production of hernia cerebri.

Increase of intracranial pressure is believed to be the cause of many of the general symptoms occurring with brain tumor, and it would seem from the writings of certain authors that the increase of pressure is attributed directly to the tumor and varies with the size of the growth. There is a condition resulting from tumor to which little attention has been paid, and which is as important, if not more so, than the size of the tumor itself, namely, enlargement of the brain. This hyperplasia is not directly proportional to the size of the tumor; it may be moderate with a large tumor or sufficient to cause much enlargement of one cerebral hemisphere where the tumor was small. The hyperplasia may be the result of irritation either from pressure, or possibly from some substance elaborated by the tumor, and is caused by an overgrowth of neuroglia tissue. The condition is not unknown in medical literature, although little is said concerning it. This hyperplasia of the brain may occur with any variety of tumor, and is not confined to glioma. It should not be confused with enlargement from glioma tissue, for it has not the appearance, microscopically, of tumor nor should it be confused with the acute brain swelling of Reichardt. The sudden fatal termination that occurs in some cases of tumor is probably the result of this enlargement of the brain, and of interference, by the general increase of intracranial pressure, with the important functions of the medulla oblongata. It may also be that hyperplasia of the brain is an important cause of impairment of mentality in some cases of brain tumor.

Distortion of certain parts of the brain is a grave complication of tumor. The displacement of the cerebellum and the occipital lobes complicates the operation, and sudden relief of pressure probably has injurious effects on parts that had been distorted gradually. Cranial nerves in the region of the medulla oblongata are liable to be stretched gradually by such distortion, and the effect of this stretching on the pneumogastric nerve may be serious.

Hernia cerebri is a serious complication of brain tumor. When it results from decompression it has been supposed to be indicative of the degree of intracranial pressure and to show to what extent the pressure has been relieved. This view is not entirely correct, as such a hernia may develop in cases in which there has been no decided increase of intracranial pressure. A hernia may cause pressure against the edges of the opening in the skull, with occlusion of vessels and softening of the part of the brain implicated in the hernia, causing in this way hemiplegia and other grave symptoms.

Dr. M. Allen Starr said he had seen a number of cases of brain tumor associated with a distinct hypertrophy of the corresponding hemisphere, but he had never ascribed to this condition the novel and interesting explanation offered by Dr. Spiller, nor could he recall any reference to it in the literature. The form of hypertrophy that follows operation in some cases and fails to occur in others has often puzzled him: he can not understand why in some cases after an operation for brain tumor there should develop an enormous cerebral hernia, while in other cases it is entirely absent, and he does not believe that it is always an evidence of sepsis.

The distortion of certain parts of the brain resulting from tumor is a well-recognized fact, and by causing pressure on or stretching the cranial nerves it might give rise to secondary symptoms and obscure the diagnosis.

Dr. Starr said that a review of his last fifty cases of brain tumor seen in private practice showed that the diagnosis as to the location of the growth was possible in thirty; in the remaining twenty, its location could not be definitely determined. In twenty of the fifty cases, an operation was urged, and in eighteen of these it was actually performed. In eleven of the eighteen the operation confirmed the diagnosis, and the tumor was removed; in two the tumor was found, but could not be removed on account of difficulties encountered in connection with the operation; in five nothing was found. The death-rate was 6 per cent.

Dr. B. Sachs said that while doubtless many had observed this hyperplastic enlargement of the hemisphere accompanying brain tumor, he thought Dr. Spiller was wise in attempting to lay stress on it. Referring to the causes of disappointment in operation on brain tumor, Dr. Sachs said that at the recent International Congress in London, Sir Victor Horsley made the statement that unless the diagnosis was made before the appearance of optic neuritis, which was generally regarded as such an important feature of the condition, it was almost too late to do the patient any good. This, Dr. Sachs thought, was rather an extreme view; in the recognition of this condition, it was not an easy matter to forego the advantages that went with the presence of a pronounced optic neuritis, and he could recall a number of instances where the diagnosis, without the eye symptoms, would have been practically impossible. In a case that was recently under his observation there was no optic neuritis, but there was evidence of tumor involvement of the fifth nerve. In addition to this there were marked cerebral symptoms and an operation was contemplated, but after three weeks' observation in the hospital and under simple hygienic treatment all the symptoms gradually disappeared with the exception of the fifth nerve involvement, and the patient was temporarily discharged. Dr. Sachs said he still believed that here they had to deal with a brain neoplasm, but the patient was so much better that the idea of an operation had been abandoned for the present, at least.

In their work at the hospital during the past year, *x*-ray plates of the cranium had been carefully studied with regard to possible changes in the formation of the sella turcica in the presence of certain brain lesions; their results, however, had proved of no practical value.

The high mortality accompanying operation for brain neoplasms might perhaps be lessened to some degree by a more careful manipulation of the brain. The most gentle manipulation and the rapid checking of hemorrhage Dr. Sachs regards as important factors in the reduction of the death rate after these operations.

Dr. Robert Abbe said he had practically come to the conclusion that decompression is the operation of choice, both on account of its comparative simplicity and the benefits accruing from it. In several instances of which he knows, this procedure was followed by prolongation of life, together, with improvement in the eye symptoms. In one case in which no tumor was found, although that diagnosis had been made and was well-founded, the patient survived a decompression operation for four or five years, and has resumed work. In another case in which the sight had been entirely lost, the decompression resulted in restoration to health and the patient was alive three years after the operation, when she was lost sight of.

Dr. J. Ramsay Hunt said that he was familiar with the enlargement of the convolutions and parts of the hemisphere in the neighborhood of brain tumors, and that he had always regarded it as the result of stasis due to an interference with the circulation, near the growth, of the blood and lymph stream. A similar condition is observed in abscess formation of acute onset, and under those circumstances the term hyperplasia is scarcely applicable. He would be inclined to attribute this swelling and enlargement to chronic stasis and edema and not to a true hypertrophy or hyperplasia of brain tissue.

In old cases, as a result of pressure and stasis, that there should be some changes in the appearance and relation of the histologic elements is not surprising, but in Dr. Hunt's experience there has been nothing in the microscopic picture of the swollen region that would have suggested the occurrence of hypertrophy and hyperplasia.

Dr. Walter Timme said that in the May, 1913, issue of the *Journal of Nervous and Mental Disease* he had published an article giving the results of some observations made in Dr. McCallum's laboratory, which perhaps might throw some light on this subject. The experiments were in connection with artificial nerve pressure, produced by tying the the vagus nerve above the diaphragm, tight enough to cause pressure but without severing the nerve. It was found on killing the animals four or five months later that there was a remarkable hyperplasia in the glands of the wall of the stomach. The number of glands of the stomach was increased from 5,000,000 in the normal cat, to over 9,000,000 in the operated animals. When both vagi were treated in this way, the hyperplasia of the glands was more pronounced. There is perhaps some analogy between this condition and the hyperplasia of the brain tissue observed by Dr. Spiller in connection with the pressure produced by brain neoplasms.

Dr. Charles A. Elsberg also has noticed this asymmetry between the size of the two lobes in cases of brain neoplasm, and had ascribed it to an increase of the fluid content on the affected side. In many cases of hernia cerebri, the protrusion can be reduced by elevation of the patient's head or by lumbar puncture or by aspiration of the ventricles or the corpus callosum, or by a combination of these methods. Dr. Elsberg called attention to the varying degrees of pressure that existed in these cases; thus at times there is a large, tense hernia occurring without apparent explanation, while at other times the protrusion may be almost collapsed, and if it is attributable to this condition of hyperplasia, it would be difficult to understand these marked differences in the pressure. He said that within the past few years he has seen two cases of tumor in the left frontal region, both located in the cortex and of the endothelial type, where the wrong side of the brain was exposed. In both of these cases there was no increase in pressure: on the contrary, there was a diminution to such a degree that it led to a later opening of the skull on the opposite side, where the tumor was really located.

Dr. Foster Kennedy has always thought that the edema produced by a brain tumor varied inversely with the distance from the tumor and that the symptoms would correspond with the lines of pressure radiating from the tumor. Dr. Kennedy described two cases of expanding cerebellar lesions producing much edema, and consequent equivocal diagnostic signs which, however, were the result not primarily of the edema, but secondarily of the intense medullary and pontine distortion, and constriction of unusual tracts by the foraminal ring.

Dr. Spiller, in closing the discussion, said that in his paper he did not discuss edema of the brain. That is an entirely different process in so far as it relates to increase of fluid in the brain. He spoke of hyperplasia, which referred to an overgrowth of the neuroglia tissue. In these cases, as shown by the microscope, there is little increase of the neuroglia cells, but sometimes proliferation of the neuroglia fibers can be demonstrated. The hyperplasia possibly is caused by chemical changes resulting from some substance elaborated by the tumor; but more likely from irritation by the tumor. It is probably not the cause of hernia cerebri and should not be confused with edema or acute swelling of the brain, which probably has some relation to hernia. This hyperplasia may extend for a considerable distance beyond the limits of the tumor, and possibly may be in part the cause of the symptomatology of brain growths. We know that a tumor of the brain may be removed at times in its entirety, and yet the symptoms may not entirely disappear, and possibly this persistence of symptoms may be attributed to alteration of nerve cells, to hyperplasia, or other changes. The same is true after a decompression operation. The mere relief of pressure does not usually remove all the symptoms, and Dr. Spiller has known the condition to be aggravated by a decompression. He showed lantern slides of a brain in which a very small subcortical tumor of the parietal lobe had caused great enlargement of the cerebral hemisphere of the same side. It would be unreasonable to attribute the hyperplasia in this case to stasis and edema of the brain. Such conditions as these described are the causes of many disappointments in operations on brain tumor.

## TUBEROUS SCLEROSIS.

**Tuberous Sclerosis of the Brain and its Relationship to Neurofibromatosis.** Tuberous sclerosis is a congenital brain disease characterized by the formation of tumor-like lumps in the convolutions and in the lining of the lateral ventricles as well as displacements of islands of grey matter in the white matter of the brain. Microscopically, it shows proliferations of glia and the presence of very large cells of uncertain origin which Bielschowsky looks on as glia cells which have undergone a "blastomatous" transformation. The disease was first described by Bourneville, the famous French investigator of feeble-mindedness. Clinically, the disease is characterized by idiocy, epilepsy, multiple tumors of the skin, kidneys and heart and various so-called stigmata of degeneration. Tumors of the kidney have been found in about one-half of the cases, apparently, as a rule, of the nature of hypernephroma. The tumors of the heart are made up of embryonal muscle. The tumors of the skin are numerous and vary in size from that of a pin head to that of a split pea and their somewhat variable histology also suggests their origin in congenital malformation and misplacements. The above description of tuberous sclerosis which is chiefly adapted from the one given by H. Vogt[9] with the emphasis on the multiple occurrence of tumor-like formations of congenital origin naturally calls to mind the better-known multiple neurofibromatosis or von Recklinghausen's disease which usually consists of numerous cutaneous tumors and nevi and which sometimes is complicated by tumors in the sheaths of the cranial and spinal nerves. Recently several articles dealing with these diseases and their possible relationship have appeared. One is by P. Nieuwenhuijse,[1] who first reviews the efforts of previous investigators to correlate the two affections. The greatest impetus to these efforts has been given by the anatomic studies of Bielschowsky, whom we have already quoted as having recognized the blastomatous process in the glia as the essential lesion of tuberous sclerosis. Similarly, he describes the tumors of multiple neurofibromatosis as resulting from a similar blastomatous proliferation of the cells of the sheaths of Schwann. Nieuwenhuijse has studied four cases of tuberous sclerosis, three of them with necropsy, and one of von Recklinghausen's disease.

The latter case is that of a woman of 39, first examined in September, 1909, when she complained of spasms in the muscles supplied by the right facial nerve, and im-

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(9) Handbuch der Neurologie (edited by Lewandowsky) Vol. 3, p. 13.

(1) Zeitschr. f. d. gesamte Neurol. u. Psychiat., 1914, Vol. 24, p. 53.

paired hearing in the right ear without evidence of local ear disease. The right pupil was larger than the left, there was anesthesia in the distribution of the right fifth cranial (trigeminal) nerve and the right leg was ataxic. There was some slurring of speech. There were two cutaneous tumors on the left leg, one on the right leg and one on the right arm. Intracranial neurofibromatosis was suspected. Like many cases of intracranial tumor of various kinds the patient improved for a while on mercurial inunctions, but when re-examined in March, 1910, the symptoms were more marked and optic neuritis, loss of taste on the right half of the tongue, right-sided nystagmus and loss of both corneal reflexes had been added to the clinical picture. Two months later, a tumor mass in the right cerebellopontine angle was removed and the patient died a week later. Only the brain could be examined post mortem. While the general conformation of the cerebral hemispheres was symmetrical and normal there were several places in which the pia was thickened and adherent to the cortex which here was of increased density and slightly bulging. There were no tumors in the lining of the ventricles but numerous small white nodules were seen on the facial, auditory, glossopharyngeal and vagus nerves. Histologically, the tumors on the cranial nerves were ordinary neurofibromas, and the uneven areas in the cortex showed a typical proliferation of glia cells, increased deposits of myelin and also proliferation of vascular walls, all changes similar to those described by other authors as occurring in von Recklinghausen's disease. However, the present author does not see any striking similarity between these brain changes and those of tuberous sclerosis, and he points out that the cutaneous tumors in the two diseases are different in type. He arrives at the conclusion that the two diseases are entirely separate, as might be expected from the very different clinical course.

H. Berg[2] describes clinically eight cases, four of them in children with epilepsy, idiocy, Pringle's sebaceous

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(2) Zeitsch. f. d. gesamte Neurol. u. Psychiat., 1914, Vol. 25, p. 229.

adenoma and other congenital skin anomalies; four adult epileptics with cutaneous changes suggestive of rudimentary neurofibromatosis.

**Tuberous Sclerosis and Other Unusual Features of Epilepsy.** This is the title of a paper read before the American Medical Association in 1914, by N. S. Yawger[3] of Philadelphia. Apparently this is the first paper on tuberous sclerosis, in the English language, as neither the author nor William G. Spiller, who participated in the discussion, is aware of any other. Two cases are reported as follows:

"Case 1.—The first patient is a girl of Italian descent, aged 14, whose attacks began at 7 years. She is one of six children, and the others, it is stated, are healthy. She was never robust and is said to have had rickets in infancy. Mentally, she is an epileptic imbecile, and temperamentally she is morose and abnormally sensitive. The seizures are major in type, and three and one-half years ago she had status which lasted eleven days. Physically, her appearance is somewhat grotesque with a possible element of achondroplasia. There is also something suggestive of cretinism, and with this thought in mind she was placed on thyroid extract. For a time decided improvement was made and this was manifested in various ways; in six months she gained fifteen and one-half pounds in weight, there was an increase of two inches in height, she was less irritable and much more alert mentally, and while there were on an average twenty-five seizures a month before the administration of thyroid, during this treatment for a period of six months she was free from attacks; unfortunately, she relapsed. This individual (Plate II, A) is small in stature, her legs are abnormally short and her hands reach almost to the knees; she is loose jointed, shows marked lordosis and has a protuberant abdomen; her features are thickened and the thyroid is not palpable. The pulse-rate is usually from 90 to 100 and the specific gravity of the urine is always low, sometimes not more than 1.002, but without albumin or casts. She is surprisingly tolerant of cold, never appearing uncomfortable even though thinly clad in the coldest weather.

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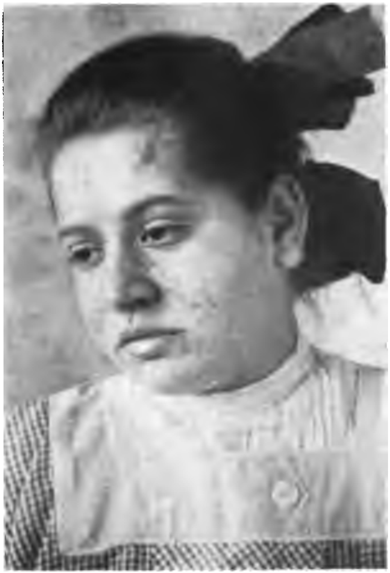
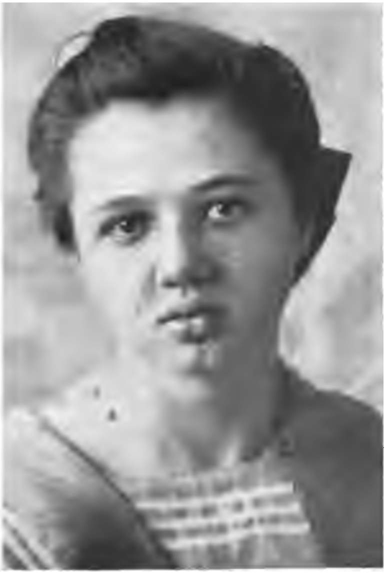
(3) Jour. Amer. Med. Ass'n., Oct. 17, 1914.

# PLATE II.



Epileptic imbecile showing adenoma sebaceum, angiromata and tumor masses.



Epileptic imbecile showing the same condition as above tho more rudimentary.—N. S. Yawger. (Page 72.)

"The following very complete dermatologic report is by Dr. O. H. Foerster: On both cheeks, grouped above the nasolabial furrows, are numerous small pin-head to wheat-grain-sized papular tumors, discrete and confluent, firm, with convex summits, and of brown and yellow-red color. The larger growths are associated with well-marked telangiectases and on pressure are yellow-red in color. The remaining portions of both cheeks are clear, except for several similar isolated lesions of half-pin-head size. On the chin are about twenty similar discrete lesions of less than pin-head size.

"Both alae nasi, and tip and dorsum of nose are practically covered by waxy or translucent, pink to yellowish, elevated, convex, closely set and confluent, papular growths of firm consistency. Several are associated with telangiectases, though less developed than on the cheeks. Similar, more rudimentary lesions of less than one-quarter pin-head size, and yellowish in color, are situated on the upper lip. In both nasolabial angles the lesions are more prominent and grouped, so as to give a verrucous appearance. On the left upper eyelid are several tiny lesions with color of normal skin.

"On both sides of the forehead, extending toward the eyebrows from just within the hair-margin, are two elevated tumor masses of irregular outline, light yellow-red in color, with smooth flat surface except for several shallow clefts or furrows. The entire right temporal region down to a line between the outer edge of the right eyebrow and the right ear is occupied by a firm growth with irregular margins, of yellow-red color, lobulated on deep palpation, and of verrucose appearance. Embedded in the scalp at the right parietal region and at the occipital protuberance are two firm, ovoid, elevated masses of finger-nail size. On the neck are several small dark, pedunculated fibromas.

"The middle-third of the forehead is studded with comedones. The tongue, buccal and labial mucous membranes are normal. The lobes of both ears are abnormally large.

"The extensor surface of the arms and dorsum of hands, from knuckles to above the elbow, is of light brown color, sprinkled plentifully with pin-head and slightly larger non-pigmented areas, with irregular, white patches of finger-nail size at the elbows and on the radial side of the right wrist. On the dorsum of the right wrist on the radial and ulnar side, are two irregular, scar-like, slightly elevated lessions, with a 'knitted' appearance, and spots of light yellow to brown pigmentation. Palms and finger-nails are normal; hair-growth is normal.

"Both legs are darkly pigmented especially at the knees and show several areas of entire loss of pigment from finger nail to small palm in size.

"The skin of the back is of darker color than normal, with a moderate eruption of acne on the shoulders, upper back and in the sacral region. On the right shoulder is a group of three fibromatous, yellow growths. Arranged irregularly in a belt-like manner just above the hips are several flat fibromas.

"Case 2.—The second patient is a girl of Slavic parentage, aged 15. It is said that her father has some curious markings on his face and that he has periodic headache and fainting-spells. A paternal uncle also had attacks of headache. At the age of 3 years this girl was hit on the head by a ball and was unconscious for a time. Her attacks began at the age of 4 years and her rank is that of an epileptic imbecile. For a time the seizures occurred daily but gradually they became less and less frequent and now she is for months without attacks. This individual presents several unusual features. Her voice is peculiar, sometimes it is feminine in pitch, at others masculine and again it will 'break' as is common with the male voice at puberty. Though she had many major attacks previous to her admission to the colony, during her stay of two and one-half years with us, she has had only three complete epileptic seizures. Twice there have been vasomotor discharges in the form of intense redness which has covered all exposed parts of her body. Ten paroxysms of uncontrollable laughter have been recorded and three of these have occurred during sleep. There is a cartilaginous thickening of the left ear which has probably resulted from a hematoma auris. The palatal arch is high and narrow. This patient (Plate II, B) is markedly stoopshouldered, she carries her head far forward and has a decidedly ungainly gait.

"Dermatologic report by Dr. Foerster: In the flushed area of the face, arranged with considerable symmetry, and grouped especially in the region of the nasolabial furrows and on the chin are numerous pin-head and slightly larger tumors, many with telangiectases on their summits. They resemble in every particular the lesions described in Case 1, but are, in general, more rudimentary, though equally characteristic. Similar pigmented patches and flat nodular fibromas are present though fewer in number and smaller. In addition, there is a large, flat nevus of the size of an adult's palm to the right of the lumbar spine."

**Eight Cases of Tuberous Sclerosis of the Brain,** one with necropsy, are reported by Paul Schuster[4] of Berlin. His views on the subject are thus formulated:

1. Tuberous sclerosis of the brain may be associated with glioma and may be ushered in with the general symptoms of brain tumor.
2. There are clinically "abortive" cases of tuberous sclerosis in which both the psychic disturbances and the epileptic features are entirely in the background.
3. The anomalies of the skin, especially the tendency to nevoid formations, are not only found in the patients but frequently in their relatives.
4. Among the cutaneous anomalies there are certain definitely characteristic forms which have a tendency to develop on certain portions of the skin.
5. Tuberous sclerosis must be considered an endogenous, familial-hereditary disease.

Case 1 is that of a boy 16 years old, the son of a tuberculous, insane father and of a mother with signs of von Recklinghausen's disease. The maternal grandmother was epileptic and had large nevi, and a maternal aunt is epileptic but has no cutaneous anomalies. The maternal great-grandmother and a cousin of the mother also had been subject to convulsions. The patient was normal until the age of 2¾ years, when he began to have attacks suggestive of *petit mal,* which, however, soon disappeared. At the age of 7 years the cutaneous erup-

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(4) Deutsche Zeitschr. f. Nervenh., 1914, Vol. 50, p. 96.

tion, to be described later, made its appearance. Between 10 and 12, sick headaches set in and became more severe at the age of 15, when his memory also began to fail.

Examination: Pronounced sebaceous adenoma on both sides of the nose; otherwise, skin normal. Greatest circumference of the head is 58 cm. Pupils normal. Bilateral choked disc is present but no complaint of visual disturbance. Other special senses and cutaneous sensation normal. Reflexes normal. No paralysis. Wassermann test negative. There was no marked mental impairment, but the boy gave an impression of weakness and effeminacy. During three months of observation he had several severe attacks of dizziness and fainting and finally a severe attack of headache and vomiting ushered in with unconsciousness. This was followed by an aggravation of the optic neuritis and hemorrhage in the left disc. A week later, a slight weakness of the left facial nerve appeared. Two weeks later he had his first attack of generalized convulsions and died.

A clinical diagnosis of tuberous sclerosis and brain tumor was made. The presence of the former condition was considered certain on account of the combination of the epileptoid phenomena and the characteristic sebaceous adenoma. The necropsy was confined to the brain, which was enlarged and the convolutions were broadened. The cortex was the seat of numerous firm and ill defined, partly prominent and partly sunken, areas most numerous in the frontal lobes, while the cerebellum and brain stem were entirely free. The lateral ventricles were enormously dilated and the right lateral ventricle contained a rounded, smooth tumor of the size of a plum, attached to the corpus striatum. There were also numerous smaller tumors in the lining of both ventricles and a general granular ependymitis was present. The histologic appearance of the tumors was that of glioma.

Case 2 is that of a boy of 19, of low intelligence, in whom a diagnosis of congenital heart disease had been made in infancy. During the first few years of his life and again after the age of 17 he had light epileptoid attacks. Sebaceous adenoma appeared at the age of 3 years and this symptom is considered the chief support for the diagnosis of tuberous sclerosis.

The other cases were very similar.

In his general discussion of the disease, emphasis is laid on the combination of epileptic phenomena, mental impairment and sebaceous adenoma. The autnor also discusses at length the occasional occurrence of neurofibroma, pigmented spots on the skin and other features of von Recklinghausen's disease.

**The Relationship Between Tuberous Sclerosis and von Recklinghausen's Disease.** This is again taken up in a new article by Max Bielschowsky,[5] who replies to the objections of Nieuwenhuijse, quoted above, and reiterates his belief in the unity of the two disorders, both depending on similar disorders of development in the central and peripheral portions of the nervous system during fetal life, resulting later in "blastomatous" processes.

## THE CEREBELLUM.

**Chronic Progressive Cerebellar Tremor.** It is a sign of the times and a source of patriotic pride to American physicians that discoveries in medicine are becoming more and more frequent in this country, and the field of neurology is no exception. In previous volumes of this series we have had the pleasure of referring to the work of the New York investigator, J. Ramsay Hunt, particularly with reference to the herpetic neuralgia of the geniculate ganglion and the occupation neuritis of the hand. This year Hunt,[6] in a prelimiary report before the New York Neurological Society under the title, "Chronic Progressive Cerebellar Tremor," directed attention to a group of cases which belong, he believes, to a definite and undescribed type of nervous disease. Three patients with this affection have come under his observation, two had been under treatment for a considerable time. The third case is of more recent date and corresponds to an earlier stage of the disease.

In the outline of the clinical picture, the two advanced cases only will be considered, in which the disease had been constant and progressive over a period of six years. The affection began in one of the extremities, either the

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(5) Zeitschr. f. d. gesamte Neurol. u. Psychiat., 1914, Vol. 26, p. 133.

(6) Jour. Nerv. and Ment. Dis., 1914, Vol. 41, p. 510.

arm or leg, as a volitional tremor of the *intention type,* which gradually increased in intensity. After an interval of a year or more a similar tremor developed in another extremity and progressed in the same gradual manner as in the limb which was first affected. A year or so later the other portions of the body were gradually involved, so that in the course of from three to four years the head, trunk and extremities presented the clinical picture of a coarse, volitional tremor. The tremor was increased by all movements, however slight, and by any excitement or mental activity. It ceased during sleep, and was always greatly diminished by rest in a relaxed or recumbent posture and usually ceased entirely in this position. Some slight rhythmical tremors of the head, hand or foot occasionally persisted even during rest in the recumbent position. It was distinctly a volitional tremor, and any attempt at a coördinated movement directed towards some object produced an increase of the shaking and that atactiform tremor which we associate clinically with multiple sclerosis. The tremor movement was slow and coarse, and averaged from three to five vibrations a second. The rate and amplitude were both increased by voluntary movements and by excitement. It was not affected by closure of the eyes.

The gait was jerky, uneven and dysmetric, the smooth harmony of movements being interrupted by coarse, irregular tremors of the head, trunk and extremities. There was no ataxia either kinetic or static. The equilibrium was easily maintained with the eyes opened or closed, even when the whole body was in a state of shaking and oscillation. The speech was slow and scanning, with a tendency to explosive utterance, or it was simply slower than normal. Finer movements of the hands were rendered impossible, so that eating and drinking were difficult, and the handwriting became an irregular scrawl. There was no paralysis, no sensory disturbances, and all the tendon and skin reflexes were present and normal. There was no loss of the perception of weights. The speaker especially emphasized the preservation of the abdominal reflexes, and the normal flexor type of the plantar reflex. The pupils were equal and reacted normally. There was no true nystagmus. Occasionally, when the head tremor was active and it was mechanically checked by holding, the tremor overflowed and appeared in the ocular muscles. When, however, the eye fixed and followed an object, there was no nystagmus. There were no explosive emotional attacks, nor crises of laughing and crying; no diplopia, no vesical trouble, visual disturbances or other signs of multiple sclerosis. The optic discs were normal, as were the other cranial nerves. Memory was intact; there were no unusual states of depression or exhaltation, and there were no evidences of mental deterioration. There were no pigmentary deposits of the cornea as have been noted in some cases of pseudo-sclerosis.

Headaches occurred before the onset of the tremor, and from time to time since. These were chiefly frontal, not of great severity and not accompanied by nausea or vomiting. There was no true objective vertigo, but in the erect posture, when the oscillation of the head was pronounced, subjective sensations of vertigo and giddiness occurred. There was no history of epileptiform seizures, cerebellar fits, or vestibular attacks. The Wassermann test with blood and cerebrospinal fluid was negative, and there was no increase of albumin or cells. The blood was normal, as was the urine, and the general visceral examination was negative, except for a small, firm enlargement of the thyroid gland in one of the cases, without symptoms of Graves' disease. There was no history of trauma, nor symptoms indicative of hysteria. Except for the coarse, progressive tremor, which gradually and successively involved one extremity after another, the only other symptoms indicating an organic disease of the nervous system were the following, and these may be referred to a disorder of certain functions of the cerebellum.

The adiadochokinesis of Babinski was distinctly present on both sides. There was also a hypotonic state of the muscles, as indicated by flaccidity and softness of the muscular tissue of the extremities, relaxation of the joints and the presence of the Stewart-Holmes sign of hypotonia (failure of the rebound or movement of extension when flexion of the arm has been resisted and is suddenly released). Mechanical and electrical excitation of the muscles was normal.

In addition, certain symptoms indicating asynergia and dysmetria were also present, *i. e.*, a failure of the harmonious grouping of the movements concerned in a coördinated act. This was especially marked in the upper extremities. While there was no weakness or paralysis of the muscles in the ordinary sense, there was demonstrable an intermittent asthenia of a peculiar character, which consisted in the inability to sustain the muscle contractions of a voluntary movement except for a brief period of time. For instance, if the patient grasped the hand of the physician and was instructed to sustain the contraction, even with special effort, relaxation took place in a few seconds and the grip loosened, and another attempt would be made only to suffer the same spontaneous relaxation. This could also be demonstrated in dorsal flexion of the foot and flexion of the arm. The author ascribed this to a defect in the mechanism regulating the muscle tonus, and it was, in a way, the reverse of what Babinski had described as cerebellar catalepsy, in which the power of fixation was greatly increased when a limb, by an effort of will, was held in a certain position. The Barany "pointing tests" had been unsatisfactory and difficult of interpretation because of the coarse atactiform tremor on intention. The caloric tests show the integrity of the vestibular apparatus.

To summarize briefly, this clinical type, which was considered worthy of differentiation, was characterized by a chronic, gradually progressive tremor, coarse and irregular in character, associated with symptoms of asynergia, hypotonia, adiadochokinesis, and the intermittent asthenia, an inability to sustain fixed or continuous muscle contractions. All these symptoms were referred to disturbance of the cerebellar function.

In the differentiation of this condition, the so-called hereditary or essential tremor may be excluded by the absence of a hereditary or family tendency to tremor, by the slow method of progression, successively involving one extremity after another, and by the associated symptoms of a cerebellar affection. The "tremor type" of

Parkinson's disease may be ruled out by the disturbances of tonus, which differs fundamentally from the rigidity and hypertonicity of that disease. There are none of the symptoms which would justify a diagnosis of hysteria, a traumatic neurosis or the pseudo-sclerosis of Westphal.

Dr. Hunt said that he realized that in the absence of any pathologic support to the contrary, the question of multiple sclerosis was an important one in the interpretation of this group of cases. If the underlying lesion was multiple sclerosis, this group deserved a place among the recognized clinical types of that disease. As, however, all the symptoms indicated a disturbance of the cerebellar function, and were slowly progressive, he would regard these cases as representing a well-defined and progressive disease of some portion of the cerebellar mechanism. The clinical type he would designate as the *chronic progressive cerebellar tremor.*

It was suggested that such cases had probably been variously classified as hereditary or essential tremor, multiple sclerosis, hysterical tremor, traumatic neurosis, and atypical paralysis agitans. The reports of three cases were given.

## THE HYPOPHYSIS.

**Hypophysis Tumor Simulating the Clinical Picture of Tabes and Paretic Dementia** (pseudo-tabes pituitaria). H. Oppenheim[7] points out that prior to the discovery of the *x*-ray and before the Fröhlich syndrome (dystrophia adiposo-genitalis) had become generally understood, it was a common occurrence not to diagnosticate hypophysis tumors during life. He now reports some new cases which show that even at the present day mistakes are easily made.

The first patient was a South American army officer, who first developed decrease in vision and in sexual power, which had led to a previous diagnosis of tabes. Examination by Oppenheim revealed simple optic atrophy and loss of tendon reflexes, which naturally suggested tabes, but the patient had gained twenty pounds

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(7) Zeitschr. f. d. gesamte Neurol. u. Psychiat., 1914, Vol. 25, p. 527.

in weight in two years and he had no beard and no axillary hair. It could also be made out by questioning the patient that he had had a bitemporal hemianopsia in the beginning and finally the *x*-ray examination showed enlargement of the sella turcica. An operation by Schloffer's method was performed by Krause and a tumor was found which could not be extirpated and the patient soon died. Necropsy showed adenocarcinoma of the hypophysis.

The second patient presented a clinical picture so strongly suggestive of tabes that Oppenheim himself was led astray. A merchant, aged 34, without a history of syphilis, had discovered two years previously that vision in the left eye had decreased, and gradually both eyes became affected. Otherwise he only complained of general weakness, especially in the lower extremities, and decreased sexual power. Examination showed optic atrophy and irregular concentric narrowing of the visual fields. The pupils reacted sluggishly to light and there was slight left-sided ptosis. The knee jerks were weak, the ankle jerks absent and there was diminution of pain sense in places below the knees. There was no ataxia. Tabes was naturally suspected, but the Wassermann test was negative, both with blood and spinal fluid. This led Oppenheim to suspect the hypophysis, and *x*-ray examination disclosed enlargement and erosion of the sella turcica. Half a year later headaches set in, and incomplete bitemporal hemianopsia developed, and the knee jerks were entirely lost. The patient refused operation.

Although anatomic evidence is lacking, the author assumes that the loss of reflexes in these cases is due to a degeneration of the posterior columns of the cord, of toxic origin and dependent on the hypophysis disease.

The following case shows that the picture of paretic dementia or, rather, tabo-paresis, may be simulated. A man of 52 had complained of failing vision for six or seven years and occasional headache and vomiting. A year and a half previously a diagnosis of paretic dementia had been made and a guardian appointed for the patient. He had showed decreased capacity in his business and also ethical lapses. Optic atrophy and left temporal hemianopsia were present; the right pupil did not react to light; the ankle jerks were difficult to elicit, but the knee jerks were present and there was no appreciable mental defect. At the time of Oppenheim's examination, *x*-ray examination showed decided enlargement of the sella turcica. A striking case of this kind was reported by Lloyd[8] of Philadelphia. The patient had a stroke with transient left hemiplegia followed by increasing apathy and dementia. There were incontinence of feces, Argyll-Robertson pupils, speech disturbance and loss of knee reflexes. A tumor of the hypophysis was found at the necropsy. These cases are instances of "pseudo-paralysis pituitaria," but there are also reports of cases of co-existing hypophysis tumor and true paretic dementia such as that of M. Goldstein.[9]

**Surgical Experiences with Pituitary Disorders.** This is the title of the Weir Mitchell lecture delivered in February, 1914, before the College of Physicians of Philadelphia by Harvey Cushing.[1] The lecture is based on no less than 148 cases of hypophysis disease, 101 being cases of tumor. In 53 cases the tumor involved the gland itself, while in 48 cases it had apparently arisen from some supra-sellar source. Radiographic and perimetric studies are to be largely depended on in distinguishing between these two conditions, and it may be said in general of individuals manifesting neighborhood complications that those showing acromegalic tendencies usually represent cases of primary glandular (intra-sellar), and those with adiposogenital dystrophic tendencies, cases of supra-glandular (or supra-séllar) tumor. However, there are many exceptions to this rule.

The following is a brief analysis of the 148 cases on the basis of their endosecretory or constitutional symptoms, irrespective of a tumefaction or otherwise of the gland or its environs. 1. The characteristic skeletal metamorphoses of acromegaly were apparent in 43 cases. 2. The reverse clinical picture, namely, that of glandular insufficiency, was evident in 94 cases, some of them of the fat and some of the lean type, and almost all with more or less marked secondary genital dystrophy, though

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(8) Proc. Path. Soc., Philadelphia, 1899.
(9) Arch. f. Psychiat., Vol. 54.
(1) Jour. Amer. Med. Ass'n., Oct. 31, 1914.

it must be acknowledged that in many, particularly the adult cases, the constitutional manifestations were so inconspicuous that they might have been overlooked had not pronounced neighborhood signs and symptoms been in evidence. 3. Finally, there occur in the series 12 cases of obvious polyglandular involvement, in which the hypophysis merely participates, without reasonable assurance that it is the primary source of the endosecretory disorder.

After a more detailed analysis of the endosecretory symptoms, the eye findings are taken up with special reference to the changes in the visual fields. As the tumors usually grow slowly, it generally takes years for the eye symptoms to develop. Though as a rule the optic chiasm is the first of the neighborhood structures to suffer, it is extraordinary what a degree of stretching and displacement it is susceptible of without affecting the acuity of vision or causing any disturbance in the fields. Of all the local symptoms, evidences of pressure on the chiasma are the most characteristic and definite. When changes in the visual fields occur, the defects in the fields usually appear in the upper quadrants, whether bitemporally or homonomously, indicating pressure against the chiasm from below. Complete hemianopsia is comparatively rare and represents a seriously advanced stage of the process.

*Deformities of the sella turcica* are of three kinds:

1. The undeveloped sella. Abnormally small sellas or sellas with fused clinoids are frequently seen in cases of primary hypopituitarism without neighborhood symptoms. Not infrequently there is a coincident failure of full development of the sphenoidal cells and the fossa may be perched on a comparatively solid sphenoidal base.

2. The sella affected by superimposed pressure. Sellas of approximately normal size but in a more or less abnormal position and with more or less irregular outline often occur in conjunction with a superimposed tumor. Under the circumstances, the diagnosis must usually hinge on the neighborhood and constitutional symptoms, though occasionally, and particularly in tumors arising from a congenital anlage, calcareous depositions in the lesions may cast a radiographic shadow.

3. The sella distended by a primary glandular struma. The enlargement is of two main types: (a) that occurring in simple acromegaly, in which bony thickening of the walls accompanies the distension, and (b) that in which progressive enlargement with thinning of the walls so deepens the fossa that it bulges into the sphenoidal cells and the thinned dorsum, if it persists at all, is represented merely by a scale of bone showing as a thin line on the negative.

The surgical treatment is discussed in detail and the cases group themselves naturally in two classes, namely, those in which the tumor is located above the sella turcica and those of tumor within the sella. In the former class, treatment is unsatisfactory as the lesion can not be approached from below except that rarely a mere "sellar decompression" may be of service. Cushing has used both the lateral subtemporal route of Horsley and the frontal approach first proposed by Hartley, Krause and McArthur and later strongly advocated by Frasier and Elsberg, but he states that his own experiences have not been particularly happy with either of these measures. On the other hand, the operations in the second class by the trans-sphenoidal route have given good results.

Cushing gives statistics of 125 operations in ninety-five patients with ten fatalities; that is, an operative mortality of 8 per cent. and a case mortality of 10.5 per cent The operations are tabulated as follows (the total of 114 cases is given, as nineteen of the patients also had been subjected to a decompressive craniectomy in addition to the direct attack on the tumor).

TABULATION OF OPERATIVE SERIES.

| | Cases. | Operations. | Fatalities. |
|---|---|---|---|
| Subtemporal decompressions ........ | 33 | 37 | 2 |
| Subtemporal explorations .......... | 8 | 8 | 0 |
| Subfrontal explorations ............ | 5 | 6 | 1 |
| Transphenoidal decompressions ..... | 16 | 16 | 3 |
| Transphenoidal extirpations ........ | 52 | 58 | 4 |
| | 114 | 125 | 10 |

**Polydactylism and Teratoma of the Hypophysis.** With this as a title, Bertolotti[2] describes the case of a

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(2) Nouv. Iconog. de la Saltpêtrière, 1914, Vol. 27, p. 11.

woman, aged 39, presenting signs of a hypophysis tumor, such as deepening of the sella turcica with bony erosion (but without enlargement of the sella), secondary optic atrophy, headache, vomiting, and mental impairment. At the age of 2 years it was recognized that she was blind, and from early childhood she showed a tendency to obesity. Her present height is 4 ft. 6¼ in. (138 cm.), weight 190 pounds. She is very obese, with particularly marked fat deposits in the abdominal wall, neck and breasts. The head is distinctly microcephalic and the extremities are short in proportion to the trunk, the shortening being most marked in their distal portions. There is a rudimentary sixth finger on the right hand and both feet have six toes. The appearance of the patient is seen in Plates III and IV.

**Diabetes Insipidus and the Hypophysis.** During the past few years much evidence has accumulated to associate diabetes insipidus with lesions of the hypophysis. We refer particularly to the observations reported by E. Franck,[3] Simmonds[4] and Cushing.[5]

P. Lereboullet, M. Faure-Beaulieu and E. Vaucher[6] report a case showing both diabetes insipidus and infantilism. The patient is a man of 24. At the age of 14 he began to drink water excessively and to void about 8000 c.c. of urine daily. Neither sugar nor albumin has ever been found in the urine, which always has been of low specific gravity. At the age of 16 he quite suddenly lost his teeth following painful ulceration of the gums. The teeth were not carious and a few months after their loss the lesions of the gums healed and have not recurred. At 18 he developed itching skin lesions with formation of ulcers on the lips, ears and in the axillae and about the arms, which healed rapidly by *x*-ray treatment but recurred from time to time. When he first came under observation the small size of the genitalia and the absence of secondary sexual characteristics were noted and his appearance suggested both infantilism and senility. There are increased deposits of subcutaneous fat in the abdomen and buttocks and in portions of

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(3) Berliner Klin. Wochenschr., 1912, Vol. 49, p. 393.
(4) Münch. Med. Wochenschr., January 21, 1913.
(5) Boston Med. and Surg. Jour., June 19, 1913.
(6) Nouv. iconog. de la Saltpêtrière, 1913, Vol. 26, p. 410.

the face. There has never been any sign of sexual development and no pubic hair and the voice is that of a child. Some eczematous skin lesions are present; perspiration is very scanty; there is no visual trouble and examination of the nervous system is negative. Signs of pulmonary tuberculosis are present and tubercle bacilli were found in the sputum. In spite of the infantile appearance, his mental development is normal. Roentgen-ray examination shows a rather small sella turcica. Examination of the urine showed the secretion of 10,000 c.c. in 24 hours with 12.87 gm. of sodium chloride, 9.72 of urea and 2.10 of phosphoric acid. Recently there had occasionally been a trace of albumin in the urine but no sugar. It is noteworthy that alimentary glycosuria was produced after ingestion of 50 gm. of glucose. There is no history or evidence of syphilis in the case and the tuberculosis is of too recent date to be an etiologic factor.

**Neurofibromatosis and Dystrophia Adiposo-Genitalis.** A combination of neurofibromatosis and dystrophia adiposo-genitalis (Fröhlich's syndrome) is reported for the first time by W. Lier.[7] The patient was a boy 9½ years old. There was bilateral optic atrophy and *x*-ray examination showed evidence of a tumor close to the hypophysis.

## THE PINEAL GLAND.

**The First Recorded Case of Operation on the Pineal Gland.** This is reported from Petrograd by L. Pussep.[8] Hitherto this organ has been considered inaccessible to the surgeon and the present case is not convincing of the surgical possibilities, as the patient never regained consciousness and died three days after the operation. A boy, aged 10, was brought to the clinic on account of headache and it was noticed that he had difficulty in fixing objects with his eyes, such effort being accompanied by repeated turning movements of the head. He then developed impairment of hearing and ataxic gait. Vision gradually failed and the right leg grew weak. Later, vomiting set in and speech became difficult. By the time he came to the hospital he was bed-ridden, and

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(7) Zeitschr. f. klin. Med., 1914, Vol. 80, p: 261.
(8) Neurol. Centralbl., May 1, 1914.

would fall forward or backward on attempting to walk. There was an intention tremor in the arms. All tendon reflexes were increased and the Babinski sign was present. Muscular sense was lost in the lower extremities and diminished in the upper extremities. The pupils were dilated and did not react to light. Both eyes were blind and showed choked disc with beginning atrophy. The eyes could only be moved a little to the right, and then only with nystagmus-like jerkings. Clinical diagnosis was made of probable tumor of the pineal body or of the corpora quadrigemina, the former site being considered more probable in spite of the absence of the characteristic symptoms of precocious genital development or of abnormal body growth. Operation was performed in the occipital region and done in two stages, the bone only being removed at the first sitting. After six days the dura was opened and the occipital sinus and the right transverse sinus were ligated. An incision was made in the tentorium which resulted in the escape of a large amount of fluid, apparently coming from a cyst. Removal of the cyst wall was impossible on account of the patient's condition. The boy died on the third day. Examination of the brain showed the cyst to be located in the pineal body, causing an indentation of hazel-nut size in the corpora quadrigemina.

The author believes that this case demonstrates the possibility of successful early surgical treatment of tumors of the pineal gland.

## DISEASES OF THE SPINAL CORD.

### LYMPHOGENOUS INFECTION OF THE CENTRAL NERVOUS SYSTEM.

**Infection of the Cord.** In the Practical Medicine Series, 1913, Vol. 10, p. 104, we reviewed at some length the interesting work by Orr and Rows on infection of the cord by extension of inflammation from peripheral foci by way of the lymphatics of the nerve trunks. In addition to extensive animal experiments, seven cases in point occurring in human beings were reported. In a new, lengthy communication these authors[9] report seven

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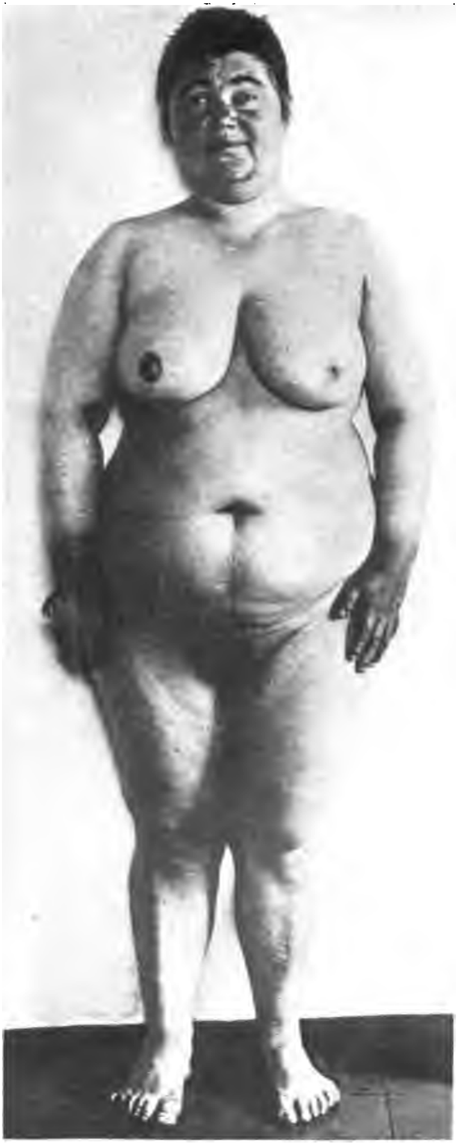
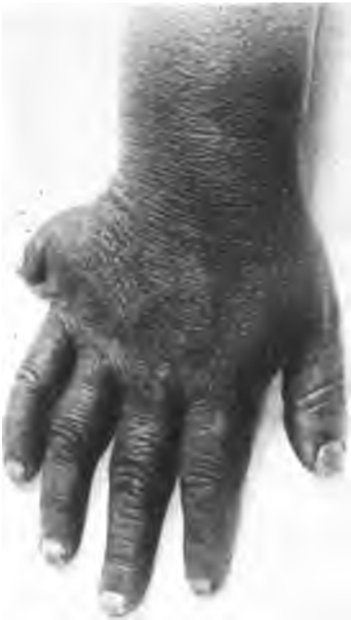
(9) Brain, 1914, Vol. 36, p. 371.

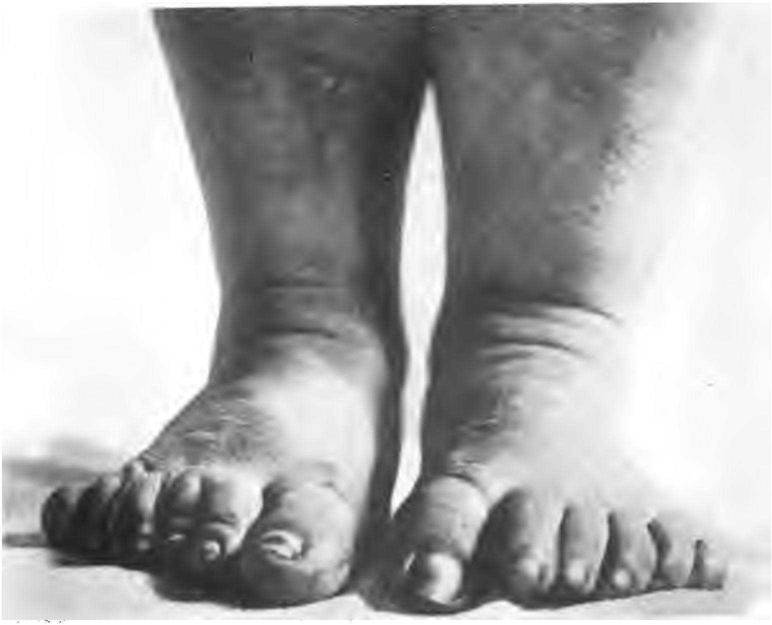
# PLATE III.



Polydactylism and obesity in a case of suspected teratoma of the hypophysis.—Bertolotti. (Page 85.)

PLATE IV.





**Right hand and the feet of patient shown in Plate III.—Bertolotti. (Page**

new cases tabulated as follows to emphasize the topographic relationship between the original infection and the lesions in the cord:

| | |
|---|---|
| *Case 1.* Bedsores; gluteal region, more severe on left side; suppuration of right elbow. | Degeneration of the posterior columns and of the anterior radicular fibers in the lumbo-sacral region from S 1 to L 3, more intense on the left side and in L 4. From D 12 to D 2 there was nothing worthy of note. Degeneration again commenced at D 1 in the root entry zone of the right side; the lesion was most marked in C 7 and C 6, and gradually diminished in the next few segments. |
| *Case 2.* Bedsores on buttocks and sacrum; of longer duration on the right side. | Lesion most intense in the right side. Slight degeneration of posterior columns in S 1; maximum in L 4 and 3; diminished gradually in the segments above this level. |
| *Case 3.* Pelvic cellulitis, renal abscesses, double empyema of longer duration on the left side, abscesses in the cervical muscles. | Very slight degeneration of the posterior columns in the sacral region. Much Marchi reaction among the anterior radicular fibers of S 4-3-2, especially on the left side. No changes in the lumbar cord. Degeneration in the root entry zones of D 11-10-9; again a separate lesion beginning in the root entry zone of D 5, more marked on the left side, and occurring in every segment as high as C 4. In the cervical region the degeneration was greatest in C 7 and 6. |
| *Case 4.* Caries of the fourth and fifth lumbar vertebrae; psoas abscess on the right side, which became septic two months before death. | In S 2 a slight lesion of the posterior columns, which increased in S 1, and was most intense in L 4 and 5. Above this level it gradually diminished. The lesion was much more marked on the right side. |
| *Case 5.* Chronic suppuration of right knee-joint. | Degeneration of the posterior columns from S 1 to the lower dorsal region, most marked on the right side and in L 4-3-2. |
| *Case 6.* Chronic suppuration of left knee-joint. | Lesion of the posterior columns most intense on the left side; slight in S 1, well-marked in L 5-4-3. The lesion ceased at D 11. |
| *Case 7.* Prostatic cancer; chronic cystitis. | Followed by transverse myelitis at level of D 8 and 9. |

"All of the above cases were studied by the Marchi method for myelin degeneration, and all showed involvement of the posterior columns in that region of the cord which corresponded to the nerve supply of the infective focus. At times also the anterior radicular fibers were affected. Case 1 and the case of brachial neuritis illustrate these two points very well. Another noteworthy point is that the degeneration of both anterior and posterior spinal roots always begins at the point where the fibers entering the cord lose their neurilemma sheath, that is, in the intramedullary portion, and in the case of the anterior roots the degeneration in some instances has been traced from the cord margin into the grey matter, where it terminated among the cells. The effect of the toxins is not always exerted on the lateral portions of the cord. In the case of brachial neuritis, however, we find the lateral diffusion very marked, a fact to be explained in all probability by the high activity of the infective focus and its close proximity to the spinal cord. The greater the degree of toxicity, therefore, in the lymph-stream, the more diffuse the cord lesion.

"The extramedullary portions of the spinal roots in the above cases were examined for degeneration with a negative result. It seems clear, therefore, that toxins can ascend along the perineural lymphatics without producing parenchymatous changes in the nerves. On reaching the cord, however, they give rise to a degeneration of the myelin sheaths with which they come into contact. At the same time, in saying this we do not mean to affirm that parenchymatous changes are absent in all cases. It will be shown elsewhere how organisms and toxins cause an epineuritis and perineuritis as they pass upward along the nerves; and it is conceivable that such, if of an acute nature or in action for a prolonged period, would tend to produce secondary parenchymatous changes, especially were an extension of the inflammatory process to take place along the septa between the nerve-bundles."

## MYELITIS.

**A Case of Acute Myelitis Secondary to Perirectal Abscess Developing a Few Hours After a Severe Fright** is reported by William G. Spiller.[1] The patient was a

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(1) Jour. Amer. Med. Ass'n., October 31, 1914.

railroad conductor who, in 1900, when 35 years old, had an attack of right sided facial paralysis from which he recovered completely. In 1903, he returned to the hospital with the statement that he had been greatly frightened by robbers but had not sustained any physical injury. He showed no symptoms until two days later, when both legs became numb. Three days later, when admitted to the hospital, he was able to walk and could stand fairly well with his eyes closed. He knew when he had passed urine or when the rectum should be emptied, but he could not feel the passage of the urine or the feces. He did not have involuntary passages. Objective sensation was little, if at all, affected. The reflexes at first were normal, but five days later the Babinski sign appeared on both sides. Eleven days after the onset he fell to the floor and had to be catheterized. Knee and ankle reflexes became exaggerated and after two more days both legs became completely paralyzed and sensation became impaired below a line two or three inches below the umbilicus. The symptoms grew worse and he died three weeks after the onset. The necropsy revealed a perirectal abscess with emphysema and cellulitis extending to the buttocks, above the brim of the pelvis, implicating the retroperitoneal space and the lymph glands of the abdomen extending as high as the pleura, following the nerves to the spinal cord, and causing general peritonitis. There was evidence of beginning pleurisy. The bladder did not contain pus. The *Streptococcus pyogenes* was obtained in cultures from the buttock. Sections from the spinal cord showed much softening in the lumbar and lower dorsal regions, with inflammation and hemorrhages most severe in the dorsal region.

In his discussion of the case, the author calls attention to the work of Orr and Rows and expresses the opinion that the myelitis in this case should be regarded as secondary to the perirectal infection. Spiller calls attention to a paper by T. J. Walker,[2] with report of three cases of acute ascending paralysis following long-standing, chronic cystitis. The first patient bad a stricture of the urethra and chronic cystitis, and during an exacerbation

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(2) Lancet, March 11, 1905.

he developed, during the night, numbness in the feet and some loss of power in the legs. The following morning he had paresis of the limbs up to the thighs. By the evening of the same day the paralysis had extended upward to the arms and thorax and breathing was embarrassed. The symptoms rapidly progressed and death occurred 18 hours after their onset. The second patient, 5 days after an acute exacerbation of a chronic cystitis, complained of uncomfortable sensations and feebleness in the lower extremities. By noon both legs were paralyzed and the patient died two days later. The third patient also had a chronic cystitis and died 18 hours after the onset of paralysis of the legs. Necropsy was not obtained in any of the three cases.

The literature of so-called urinary paraplegia is rather scanty. Attention was first directed to it in 1833 by Stanley, who explained it as reflex paralysis. Later, Leyden assumed that the inflammation first passed to the nerves and that the neuritis so produced might lead to myelitis. In 1906, G. B. Buchanan[3] reported a case of rapidly fatal ascending paralysis in a man with pyuria and prostatic hypertrophy. There was no necropsy.

*The possible rôle of the fright* in this case as provoking the cord condition is discussed at length by Spiller, who states that the fright "may have disturbed the circulation in the spinal cord and, in connection with the exertion caused by the struggle, have rendered the cord more liable to infection." He further says:

"The tendency is to attribute all acute paralyses developing immediately after fright to hysteria, and this tendency is justifiable in most cases; but there is a possibility that fright may act as an *agent provocateur,* in the sense of French writers, and be a cause of organic change. Papers bearing on this subject are found chiefly in the older literature. In many instances the fright is only a coincidence, but in others it may affect the circulation in vessels already diseased. When syphilitic endarteritis has occurred in the vessels of the cord, apoplectiform myelitis has been observed not infrequently.

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(3) British Med. Jour., January 20, 1906.

I have already written on this subject.[4] Paralysis under such circumstances may develop within half an hour without any apparent exciting cause; how much more probable is paralysis, therefore, when severe emotion disturbs an impaired circulation. Blushing shows chiefly in the face and may be intense as a result of mild emotion, but the blushing is not confined to the face and may affect a large part of the body. Are the interior organs implicated in blushing? It is at least possible. A congestion of the vessels of the spinal cord from vasomotor disturbance when those vessels are diseased may cause thrombosis, and this certainly may cause paralysis, or, if the thrombosis be mild, the vitality of the affected part of the cord may be reduced and the susceptibility to toxins may be increased. One may well hesitate at the present time to accept as proved acute organic paralysis as caused by fright in cases in which the vessels are in normal condition. It may be well to review briefly some of this older literature on fright paralysis.

"Kohts, in 1873, referred to fright as a cause of exophthalmic goiter, icterus, turning white of the hair, and cerebral apoplexy. He had an unusual experience in that he was able to observe a great many cases of nervous and other disease that developed during the severe bombardment of Strassburg. During the thirty-one days of the siege the town was bombarded almost every night; 193,722 bombs were thrown into the city, and after the surrender only two houses showed no marks of the firing. Kohts reports cases of paralysis agitans, and of myelitis and other diseases which developed immediately after severe fright, one of which was with necropsy. The people of the city took refuge in the cellars, and repeatedly saw those about them killed. The effect of psychic trauma has probably never been more clearly shown. Kohts offers no explanation for the manner in which fright leads to organic disease. It is difficult to attribute such an array of cases to mere coincidence."

Among other old cases cited by Spiller is one reported by Hine[5] of chorea of pregnancy developing

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(4) Jour. Nerv. and Ment. Dis., October, 1909.
(5) Med. Times and Gaz., 1865.

after severe fright. The mid-thoracic region of the cord was softened. Leyden reported the case of a woman, aged 21, who was awakened by fire in a house opposite the one in which she was. She was greatly frightened. Immediately after the fire was extinguished and she had returned to her bed, she experienced severe pain in the left leg. The following morning the left leg was weak, and gradually spastic paraplegia developed. A diagnosis of thoracic myelitis from fright was made. The necropsy showed sclerosis in the mid-thoracic region of the cord. Another case reported by Leyden was that of a young woman, 23 years old, previously healthy. On returning home during the siege of Strassburg, she found that her house was on fire. Symptoms began immediately and gradually the lower limbs became paralyzed and contracted. The necropsy showed chronic diffuse myelitis with meningitis, the upper thoracic region being most affected. In 1881, Brieger reported a case of lumbo-thoracic myelitis in a woman 23 years old, the symptoms appearing within a few hours after she had been frightened by a drunken man. The necropsy revealed a myelitis in the upper lumbar and lower thoracic regions. The patient had had syphilis, but Brieger says that the myelitis was not syphilitic but that it had been entirely caused by the fright, which he thought might have caused a temporary interruption of the circulation in the spinal cord, the lumbar region of which was exhausted by recent prolonged dancing.

A. E. Frank[6] describes the case of a woman, 26 years old, who developed left hemiplegia after a severe fright. The paralysis was believed to be organic and the result of a pontine lesion. No cause for this hemiplegia could be determined; the heart appeared to be normal and at first no signs of syphilis could be detected, but the Wassermann reaction was positive. Careful examination showed small scars near the mouth, the result of a facial eruption at the age of 5 years. The history of corneal opacity at the tenth year was obtained, so hereditary syphilis probably existed. The author states that it is not likely that a healthy vessel would rupture from an

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(6) Berliner Klin. Wochenschr., June 21, 1909.

emotion, but a diseased pontine vessel might yield and the blood leak out gradually.

## ACUTE ANTERIOR POLIOMYELITIS.

**Localization of the Virus: Pathogenesis.** Important work on epidemic poliomyelitis continues to be produced at the Rockefeller Institute for Medical Research. This year Simon Flexner and Harold L. Amoss[7] relate the results of experiments which throw important light on the mechanism of the spread of the virus from the atrium of infection to the nervous system. They point out that it has been shown by experiment that the poliomyelitic virus readily reaches the central nervous system when it is brought into relation with the peripheral nerves.

"It is in this manner that infection is induced when the virus is brought into contact with the nasal mucosa, sciatic nerves and probably also when it is injected into the subcutaneous tissues and the peritoneal cavity. Thus deposited, the virus ascends by way of the nerves to the olfactory lobes of the brain or to the spinal cord and intervertebral ganglia. It is to be assumed that in the case of the spinal nerves the ascent is by way of the afferent or sensory fibers. Hence the virus is carried both by nerves of common and of special sensation. In these instances the virus is brought into relation, not with special end-organs, but with nerve fibrils along which it travels. It appears, however, that the virus may enter the nerves by way of specialized end-organs, which are themselves not appreciably injured by it.

*Intra-Ocular Inoculation.* An emulsion of the spinal cord carrying the active virus, and free from bacterial contamination can be injected into the vitreous chamber of the eye without causing appreciable inflammation. A small quantity of the vitreous humor is aspirated under ether anesthesia by means of a tuberculin syringe carrying a very fine needle and replaced by an emulsion of the virus. The cloudiness thus caused tends to disappear and the vitreous body to return to normal. After a variable incubation period symptoms of experimental poliomyelitis appear, with paralysis and characteristic lesions.

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(7) Jour. Exp. Med., 1914, Vol. 20, p. 249.

Two experiments on monkeys are related, each animal receiving 0.2 c.c. of emulsion of active virus in the vitreous. The first one became excitable nine days after inoculation and two days later weakness of the arms appeared. Three days later there was paralysis of the right arm and weakness of the left leg. After 10 days, or 24 days after the inoculation, the animal died from diarrhea. The necropsy revealed dysenteric lesions of the large intestine, and microscopic examination of the cord, medulla, and intervertebral ganglia showed typical lesions of poliomyelitis. The retina of the inoculated eye appeared normal. The second monkey became excitable seven days after the injection, and in the course of a few days more developed paralysis of the left arm, some weakness of the right arm and left leg, double ptosis and slight left facial paralysis. The cord, medulla, and intervertebral ganglia presented typical lesions of poliomyelitis and the ophthalmic ganglia on the inoculated side showed diffuse, cellular infiltration. In connection with these experiments, it is stated that Landsteiner and Levaditi five years ago reported having produced paralysis by inoculating the virus into the anterior chamber of the eye.

*Distribution of the Virus After Intravenous Inoculation.* Previous work has shown that intracerebral and intraspinal injections of the virus are most certain of reproducing the disease and that injections into the peripheral nerves are fairly certain, especially when made a short distance from the central nervous system. On the other hand, even much larger quantities of the virus injected directly into the blood produce only occasional and inconstant infection. In a previous article,[8] the authors have shown that in order to reach the central nervous organs from the blood, the virus must pass into the cerebrospinal fluid, with which it reaches the interstices of the tissue. Since the cerebrospinal fluid is a product of the activity of the choroid plexus, it has been assumed that the virus must first penetrate that structure.

When the virus is injected directly into the blood, it is quickly distributed throughout the circulatory system

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(8) Jour. Exp. Med., 1914, Vol. 19, p. 411.

in the manner in which other microörganisms are distributed. Previous experiments have shown that the virus does not remain long in the circulating blood. The authors have endeavored to ascertain the mode of distribution of the virus among the various organs by sacrificing at intervals the infected animals and inoculating emulsions of the organs themselves, the object being to determine whether the virus is distributed mechanically, or according to the affinity which the several organs display toward it. One monkey was inoculated intravenously with an active virus and three days later the cord, medulla, crura cerebri and intervertebral ganglia were removed aseptically. Emulsions of these structures were injected intracerebrally into three monkeys. The animal receiving the emulsion of intervertebral ganglia developed typical poliomyelitis, while those injected with emulsion of cord and medulla and emulsion of crura cerebri remained well indefinitely. Another monkey was killed four days after intravenous inoculation and other monkeys were inoculated with emulsions from certain organs, with the following results:

The animals inoculated with material from the cord, medulla and kidney developed no symptoms, while a monkey inoculated with a suspension of the spleen and another inoculated with suspension of bone marrow of both femurs developed typical poliomyelitis. Similarly, a monkey was killed five days after intravenous injection. The animal inoculated with suspension of cord and medulla remained well, while those injected with suspension of the spleen and suspension of bone marrow developed the typical disease. From these results, the authors conclude that in spite of the essential affinity which the spinal cord and brain exhibit for the poliomyelitic virus, they are nevertheless unable to remove it directly from the blood prior to some change taking place in the vascular or secretory structures that preside over the production of the cerebrospinal fluid, while the spleen and bone marrow, but not the kidney, readily remove it from this source. The intervertebral ganglia appear capable of obtaining the virus from two sources, namely, directly from the blood and indirectly from the cerebrospinal fluid.

A monkey injected intravenously with 250 c.c. of centrifugalized virus developed no symptoms and was killed seventeen days later. No lesions were found in the cord, medulla or intervertebral ganglia. A monkey inoculated with emulsion of cord and medulla from this animal remained normal, while one injected with suspension of the spleen developed poliomyelitis. According to the authors, this experiment indicates first that the virus of poliomyelitis is capable of surviving for a considerable period in the interior of the body without inducing an infection of the central nervous system and next that this long sojourn is not without effect on the quality of the virus which would appear to have been weakened by the action of the spleen.

*Effect of aseptic meningitis.* It was found that inflammation of the meninges increases their permeability and that the introduction of sterile, alien blood serum into the subarachnoid spaces causes an aseptic inflammation of mild degree that reaches its maximum in 24 hours and then subsides. Experiments were made to ascertain the effect of this inflammation on the penetration of the virus of poliomyelitis into the central nervous system. First, two control monkeys received intravenous injections of a suspension of the cord and medulla of an infected paralyzed monkey. Both animals remained well. A third monkey first received an intraspinous injection of horse serum and on the next day an intravenous injection of the same virus which had been given to the other two animals, and this time pronounced lesions of poliomyelitis developed. The conclusion is that the horse serum produced a state of mild chemical inflammation and an increased permeability of the meninges and choroid plexus, so that an otherwise inadequate quantity of virus became capable of causing infection of the central nervous organs.

*The Lesions Caused by Intravenous Injections.* These were thoroughly studied and, while at times the lesions in the nervous system were indistinguishable from those produced by intraneural inoculation, in some instances there was an unusual degree of vascular involvement, particularly marked in vessels of very small size.

"What appear, however, to be especially important are the changes detected in the choroid plexus in which infiltrative lesions have hitherto not been observed. That definite lesions of the plexus may occur is clearly indicated by the experiments. As yet no evidence has been obtained of morphologic alterations in the ependymal cells, but merely in the blood-vessels beneath them. That the secretory functions of the plexus are altered in the direction of greater permeability may be safely assumed, from which it follows that the experiments indicate that when the poliomyelitic infection is induced by the intravenous injection of the virus there arise not only the common lesions of poliomyelitis, but also certain additional lesions of the blood-vessels and choroid plexus which are of peculiar and distinctive nature.

"Since the precise mode of infection in human cases of poliomyelitis may be regarded still as an open question, this criterion of a blood invasion may prove of assistance in the solution of the problem. So far as can be judged from the study of the tissues from several human cases, a corresponding wide-spread vascular involvement to that arising in the experiments would seem not to have occurred."

*Intraspinous Serum Protection.* It has been shown previously that the intraspinous injection of an immune serum sometimes is effective in preventing poliomyelitic infection in the monkey when intravenous injection of the serum does not prevent infection. In the new experiments it was first ascertained that the virus used was capable of inducing paralysis by intravenous injection, which was done by the previous production of an aseptic meningitis by injections of horse serum. It was found that infection could be prevented after intravenous injection of this potent virus when such injection was immediately followed by an injection intraspinously of immune monkey serum, while normal monkey serum had no such effect. The next step was to determine whether a similar neutralization could be effected when the virus was injected intraspinously instead of intravenously. A monkey received 1 c.c. of an emulsion of active virus by lumbar puncture. Two hours later 3 c.c. of immune monkey serum were also injected intraspinously, and again on each of the following three days; then after a two-day interval, again three daily injections were given. This animal remained well, while a control animal, which went through the same procedure with normal serum instead of immune serum, developed typical poliomyelitis and died.

The permeability of the choroid plexus was further investigated by means of injections of suspensions of carmine into the cerebral ventricles. At the same time lumbar puncture was made and the ventricular injection was continued until the fluid escaping from the needle in the back was colored by the carmine. Similar injections were made in monkeys in which an aseptic meningitis had previously been set up by means of horse serum injections. On the whole, the distribution of the pigment was similar in both experiments, except that in the animal previously treated with horse serum a greater amount of pigment had entered the ependymal and subependymal cells of the ventricles.

*Pathogenesis of Poliomyelitis.* As the statements of the authors on this subject must be considered the last word and embody all deductions warranted by all available clinical, anatomical and experimental data, they will be quoted in full:

"A consideration of the experiments described in this paper should deal with the question of the pathogenesis of poliomyelitis which they are believed to elucidate.

"We are confronted with the problem as to the site of entrance of the virus of poliomyelitis into the human body, as well as the manner in which the specific lesions of the disease are produced. The latter question has already been cleared up in large measure. It is now sufficiently obvious that the virus possesses affinity for nervous tissues in general, but for no element of these tissues in particular. The constancy with which meninges, blood-vessels, interstitial parts, and nerve cells are affected indicates that they all react to the presence of the virus. On the basis of actual observations it can not be stated that virus is attracted by the nerve cells, either alone or necessarily in advance of the other structures mentioned; while the experiments here recorded show that it is only when the virus is brought to the nervous organs otherwise than by the general blood that the tissues composing them are able readily to remove and attach it to themselves.

This latter fact is a cardinal point, and one from which we may derive valuable information on the pathogenesis and mode of infection of the disease.

"It may be regarded as established that all intraneural means of infection are successful, and that the virus travels with more or less ease and certainty along the nerves to the interstices of the central nervous organs, probably utilizing the lymphatic channels of communication. The experiments given in this paper show that the central nervous organs, excepting the intervertebral ganglia, are incapable of removing the virus from the general blood prior to changes induced in the blood-vessels and in the choroid plexus. They indicate, also, that in the monkey these preliminary lesions are of a nature that permits of differentiation from the lesions caused by the intraneural modes of infection. The lesions in human cases of poliomyelitis would seem to correspond with those caused by intraneural and not by intravenous inoculation. In general it should be stated that the intraneural modes of inoculation are effective in proportion to the degree with which they bring the virus into intimate relation with the central nervous tissues. On that account, intracerebral inoculation is the most effective, because it not only insures contact between the virus and the mechanically injured tissues but also because it isolates the virus in the brain tissue under conditions favorable to multiplication and gradual diffusion into the ventricles and cerebrospinal fluid. Intraspinous injection is somewhat less effective for the reason that a part, and sometimes perhaps all, of the virus may be carried into the general blood before it can reach and become attached to the nervous tissues. Intranasal infection is, in keeping with the general statement made above, more certain in its results than subcutaneous or intrasciatic inoculation, because of the proximity of the short olfactory nerve fiber to the brain tissue. It may fail, because the virus is washed away before it reaches the olfactory fibers and can be carried to the brain. Possibly intraocular inoculation may prove among the most successful, because the virus can not escape and has only a short distance to travel to the brain; while the vitreous humor may even prove a favorable medium for its multiplication.

"In the main, under natural conditions, it is the upper respiratory mucous membrane that would most often become contaminated with the virus, and most readily favor its conveyance to the brain. This series of events is determined by the manner in which the virus is thrown off by the infected body, by the fact of its presence on the nasal mucosa, even in healthy persons in contact with cases of poliomyelitis, and by the demonstration that it passes, on the whole easily, along the olfactory nerve fibers to the brain, medulla and spinal cord. Although the virus is conveyed to the nervous organs from without by the lymph, the distribution throughout the nervous system is, in large part at least, effected through the medium of the cerebrospinal fluid. Even when the virus passes from the blood into the nervous organs, it takes the indirect course through the cerebrospinal fluid. This important fact has been established, not only by the finding of the virus by inoculation tests in the cerebrospinal fluid after a blood injection, but also through the prevention of infection by the injection of immune serum into the subarachnoid spaces after lumbar puncture following the intravenous infusion of the virus under conditions insuring infection.

"Thus the experimental evidence, which is upheld by observations in human cases of poliomyelitis, supports the view that epidemic poliomyelitis is caused by the entrance into the body of its specific microbic cause or virus, through the upper respiratory mucous membrane to the olfactory lobes of the brain, from which by means of the cerebrospinal fluid it is distributed throughout the substance of the nervous organs; but, since the virus may reach the brain by way of any nervous channel, and even, although with great difficulty, from the blood, it is, of course, possible that in exceptional instances other modes of infection may arise.

*Summary:*

"The virus of poliomyelitis is capable of penetrating the retina without producing apparent injury, to reach the central nervous organs.

"The virus injected into the blood is deposited promptly in the spleen and bone marrow, but not in the kidneys, spinal cord, or brain.

"Notwithstanding the affinity which the nervous tissues possess for the virus, it is not removed from the blood by the spinal cord and brain until the choroid plexus and blood-vessels have suffered injury.

"The intervertebral ganglia remove the virus from the blood earlier than do the spinal cord and brain.

"An aseptic inflammation produced by an intraspinous injection of horse serum facilitates and insures the passage of the virus to the central nervous organs, and the production of paralysis. The unaided virus, even when present in large amounts, passes inconstantly from the blood to the substance of the spinal cord and brain.

"When the virus within the blood fails to gain access to the central nervous organs, and to set up paralysis, it is destroyed by the body, in course of which destruction it undergoes, as a result of the action of the spleen and, perhaps, other organs, diminution of virulence.

"The histologic lesions that follow the intravenous injections of the virus in some but not in all cases differ from those which result from intraneural modes of infection.

"In escaping from the blood into the spinal cord and brain, the virus causes a lymphatic invasion of the choroid plexus and widespread perivascular infiltration, and from the latter cellular invasions enter the nervous tissues. A similar lymphoid infiltration of the choroid plexus may arise also from an intracerebral injection of the virus.

"The histologic lesions present in the central nervous organs in human cases of poliomyelitis correspond to those that arise from the intraneural method of infection in the monkey.

"The virus in transit from the blood through the cerebrospinal fluid to the substance of the spinal cord and brain is capable of being neutralized by intraspinous injection of immune serum, whereby the production of paralysis is averted.

"Carmine in a sterile and finely divided state introduced into the meninges and ventricles sets up an aseptic inflammation, but is quickly taken up by cells, including ependymal cells. When an aseptic inflammation has been previously established by means of horse serum, or when the nervous tissues are already injured by the poliomyelitic virus, the pigment appears to enter the ependymal cells more freely.

"The experiments described support the view that infection in epidemic poliomyelitis in man is local and neural, and by way of the lymphatics, and not general and by way of the blood. Hence they uphold the belief that the *infection atrium* is the upper respiratory mucous membrane."

**A Comparison of the Lesions of "Distemper" in Dogs with Those of Human Poliomyelitis.** In recent years considerable attention has been given to diseases in animals which more or less closely resemble epidemic poliomyelitis. Of these diseases the so-called Borna disease of horses was described and the illustrations of the characteristic lesions reproduced in the Practical Medicine Series, 1911, vol. 10, p. 163, and "loupin ill" of sheep in the same Series, 1913, vol. 10, p. 120. The so-called "distemper" occurring in dogs is frequently mentioned, but comparatively few of us are aware that this constitutes a fairly definite clinical entity. We must, therefore, be grateful to J. P. McGowan and J. W. Dawson[9] of the Laboratory of the Royal College of Physicians of Edinburgh for presenting in a concise form the principal facts regarding this disease.

The nervous system may be involved in several ways:

1. Violent, generalized convulsions may come on very suddenly and the animal dies in a short time in a condition of status epilepticus. The brain shows intense engorgement of the vessels and hemorrhages. (Plate V, A.) There is no meningitis.

2. This form is characterized by choreiform movements and is known as "distemper chorea." However, it has nothing to do with chorea as it occurs in children, as the twitchings are caused by inflammation in the brain and its meninges. The cell infiltrations, both in the meninges and about the blood-vessels, are mononu-

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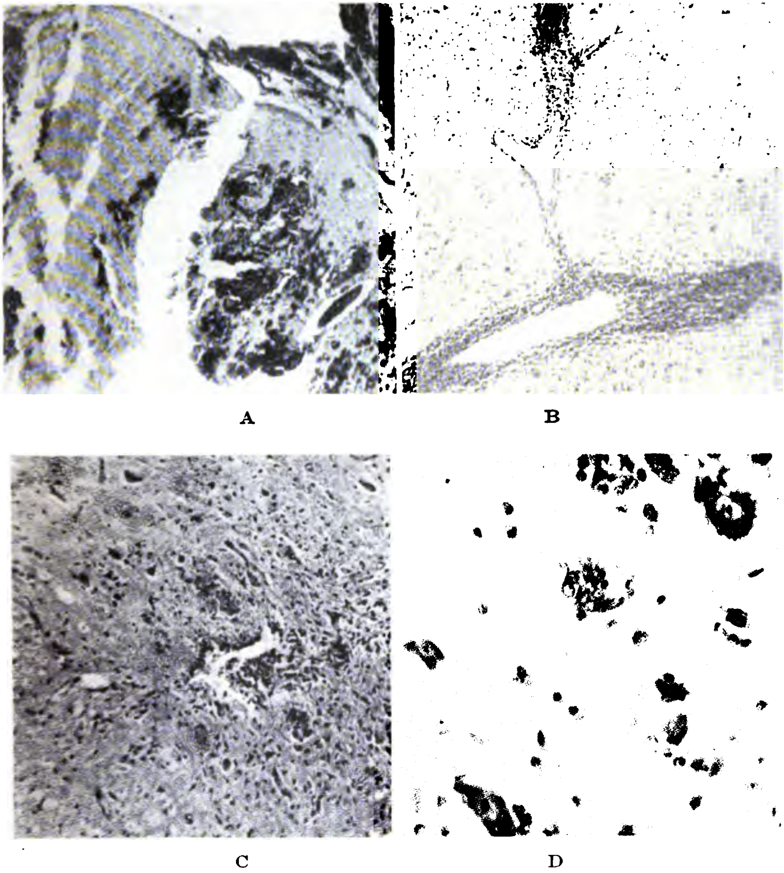
(9) Jour. Path. and Bact., October, 1914.

## PLATE V.



A. Hemorrhage in crus cerebri in dog which died in status epilepticus subsequent to "distemper."
B. Perivasular inflammation in brain. "Distemper chorea" in a dachshund.
C. Inflammation in grey matter of thoracic region of cord in "distemper" paralysis.
D. Lumbar cord from case of acute "distemper" paralysis showing phagocytic cells about the ganglion cells (neuronophagia).
—McGowan and Dawson. (Page 104.)

clear in type. No polymorphonuclear cells are seen, as is the case in ordinary meningitis. (Plate V, B.)

3. The spinal type is characterized by flaccid, atrophic paralysis of one or more limbs, more frequently the hind limbs. The authors observed six cases in dogs and two in cats. The tissue changes are limited to the cord and consist of: a meningitis whose cells are of the lymphoid type; an infiltration of the posterior roots and vessel walls with similar cells; necrosis of the grey matter; an infiltration of the grey matter of the cord, more especially of the posterior horns with lymphoid and compound granular cells; a small but definite amount of neuronophagia; hemorrhages into the grey matter and edema of the white matter of the cord; finally changes in the nerve cells showing all stages of degenerative process from commencing chromatolysis to complete destruction. Here also no polymorphonuclear cells are seen. (Plate V, C and D.)

In a previous publication, McGowan[1] has described a microörganism which is thought to be the cause of this disease, as injection of cultures has produced characteristic lesions. The authors believe that the organism localizes itself in the respiratory tract and that the changes in the nervous system are toxic in origin. Cultures were made from the brains and cords in a large number of cases and only once have a few colonies of the "distemper" organism been obtained from the brain, but this was considered due to an accidental escape from a bilateral purulent otitis media. Furthermore, the authors have shown that this bacillus can produce in cultures a powerful nerve toxin, as intraperitoneal injections of the autolysed cultures have caused fatal convulsions and lesions in the brain and cord.

The authors refer to the case of Flexner and Clark[2] of "Paralysis in a Dog Simulating Poliomyelitis," in which "the paralysis resembled the paralysis of poliomyelitis and differed from the common distemper paralysis," and are of the opinion that this is a case of distemper paralysis. The same is thought to be true of

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(1) Jour. Path. and Bact., Vol. 15, p. 372.
(2) Jour. Exp. Med., 1913, Vol. 17, p. 577.

the cases reported by Batten and Holmes[3] and by Batten.[4]

## DISSEMINATED (OR MULTIPLE) SCLEROSIS.

**Review of Studies of Sclerosis.** Collins and Baehr[5] have encountered this disease ninety-one times in the course of examination of approximately 12,000 individuals presenting themselves as subjects of nervous diseases in private, dispensary and hospital practice. Their *résumé* of their studies is as follows:

"Disseminated sclerosis is encountered much less frequently in this country than abroad. This is due, in part only, to the fact that early and irregular cases frequently escape recognition here.

"The fully developed, classical Charcot type of the disease is rarely seen.

"Trauma, including occupation injury, intoxications, biologic crises, mental shocks, etc., play only a contributing rôle in the development of the disorder.

"The disease is regarded by us as a parenchymatous degeneration due to the action of a toxin circulating in the cerebrospinal fluid.

"There can be no rigid grouping of types of the disease. Nevertheless, three general groups can be assumed: a spastic-paretic, an ataxic, and a hemiplegic group.

"The best single aid in the differential diagnosis is the condition of the cerebrospinal fluid. The Wassermann reaction is practically always negative. The number of lymphocytes is less than fifteen, and there is no excess of globulin. This is of especial value in ruling out cerebrospinal syphilis.

"The remissions which sometimes occur are singularly characteristic of this disease. In our series, however, they were rarely encountered.

"The absence of the abdominal reflexes, upper and lower, is an important diagnostic sign."

Every phase of the disease is discussed with great

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(3) Proc. Royal Soc. Med., London, 1908, Vol. 1 (Neurol. Sect.), p. 22.

(4) Proc. Roy. Soc. Med., London, 1913, Vol. 6 (Neurol. Sect.), p. 114.

(5) Amer. Jour. Med. Sci., October, 1914, p. 495.

clearness and a perusal of the entire article will give the reader an excellent idea of the present state of our knowledge or rather, ignorance, of this disease. We will quote in full the remarks on "the character and origin of the pathologic process":

"We know no definite or adequate explanation of the nature of the process. The essential question of which structure is primarily involved has never been answered. If we possessed such information we should soon after, in all probability, discover the nature of the disease process. The four well-known hypotheses concerning this problem are still with us and each has its supporters.

"1. *The Parenchymal Theory.* (Adamkiewicz, Huber, Redlich, Risien Russel, Borst, Thomas, and others.) The neurons themselves are initially involved. Through the action of a toxic agent circulating in the blood or the cerebrospinal fluid there occurs focal destruction of the sheaths and axis-cylinders. Subsequently, there is secondary proliferation of the glia, and eventually structural vascular changes may develop. New evidence has recently been offered (Siemerling and Raecke) which appears to support the idea that the process is a definite parenchymatous inflammation inaugurated by capillary hemorrhages.

"2. *The Interstitial Theory.* (Charcot, Leyden, Wernicke, Erb, Goldscheider, Gowers and others.) This is the oldest of the views and is summed up by Charcot's definition, 'a primary and multilocular chronic interstitial myelitis or encephalitis.' The interstitial tissue is the initial seat of the pathologic process; the changes in the parenchyma are secondary. Leyden and Goldscheider are of the opinion that the whole process is a type of chronic myelitis.

"3. *The Multiple Gliosis Theory.* Strümpell regards the disorder as a multiple gliosis, owing its existence to some congenital or inherited tendency to proliferation of this tissue. Here too the glia is the initial structure implicated, but the disorder is not inflammatory in character. Strümpell compares the disease to multiple neuroma, lipoma and others in which congenital influences evidently play an important rôle. This hypothesis is the only one which assumes an endogenous cause for the disease. Such an inherited tendency may be alone sufficient, but exogenous influences may give the impetus to development of the process. E. Müller and Byron Bramwell support Strümpell's idea.

"4. *The Vascular Theory.* (Rindfleisch, P. Marie, Ribbert, Bastian, Popoff, Buss, Hess, Williamson and others.) This theory attributes the disease to a primary disorder of the blood-vessels, with secondary changes in the parenchymal and interstitial tissues. Tredgold rejects it, saying that local areas of necrosis as a result of vascular disease have not the sharp, punched-out appearance of those in disseminated sclerosis. As a matter of fact, vascular changes are rarely prominent in this disease, while they are pronounced in definite vascular disease such as syphilitic endarteritis. In many cases of disseminated sclerosis no vascular changes whatsoever are to be found.

"Notwithstanding the fact that knowledge concerning the origin of the disease is quite indefinite, we are ready to accept the view that it is essentially a parenchymatous degeneration produced by a toxic agent. Whether this be a degenerative process from the very beginning or whether it be preceded by an actual inflammation remains to be discovered."

## SPINAL CORD TUMOR.

**Surgical Treatment of Intramedullary Affections of the Spinal Cord.** Charles A. Elsberg[6] in a paper read before the International Congress of Medicine in London discusses the surgical possibilities in cases of tumor and other pathologic conditions within the spinal cord, giving in detail the principles underlying the method of extrusion devised by himself which promises relief in cases formerly considered beyond any therapeutic aid. While the majority of tumors affecting the spinal cord are located outside of the cord proper, intramedullary tumors are not by any means rare. Thus Schlesinger compiled 302 cases of tumor of the cord, 125 of which were within the cord substance, and Flatau found 57 intramedullary tumors in 213 cases. The author's de-

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(6) Surg. Gynec. and Obst., February, 1914, p. 170.

scription of his method of dealing with such tumors is lucid and it is no exaggeration to state that this is one of the most noteworthy advances in the surgery of the central nervous system. To quote his own words:

"The attempt to remove a growth from within the substance of the spinal cord, no matter how carefully it was done, would require an amount of handling and a degree of manipulation of the delicate tissues of the cord that would, in the large majority of cases at least, be certain to be followed by a traumatic inflammation that would damage or destroy all the elements of the cord at the spot and would probably be permanent in its effects. Therefore, it was necessary to devise a new method for these intramedullary new-growths, and two years ago, together with Dr. Beer, I described a method of operation to which I gave the name 'the method of extrusion,' by means of which it is possible to remove a tumor from the substance of the cord with a minimum amount of injury to the cord tissue.

"The theory on which the method of extrusion is based is the following: There must exist within the cord a certain intramedullary pressure, as exists in all solid or fluid substances. When a tumor grows in a part of the cord, the intramedullary pressure must be locally increased. If an incision is made down to the growth, Nature will proceed to readjust the pressure conditions, and in so doing, will push out—the conditions being favorable—whatever has caused the local increase of pressure. When, therefore, an incision is made down to the tumor in the cord, the tumor will be slowly pushed out of its bed and will be slowly extruded from the cord substance. Nature will accomplish this process slowly—nerve fibers being slowly pushed to the sides while the growth is being extruded—and with far less injury to the cord structure than by the most careful manipulations of the surgeon.

"If these theoretical considerations were correct, then the surgeon would only have to incise the cord down to the tumor and then have to wait for the readjustment of pressure conditions when the tumor should be found outside of the cord tissue.

"In the first patient in whom I encountered an intramedullary tumor, I determined to test the correctness of this theory (Case 1). At the operation, the swollen cord was incised, and the incision watched for several minutes. Soon there was to be seen a bulging of a small bit of tumor mass through the incision, and while we watched it, the protrusion gradually increased in size while the incision in the cord gradually lengthened. The muscles, fascia and skin were then closed by suture, and the patient sent back to her bed. One week later, the wound was reopened, and the entire tumor was found lying outside of the cord, so that after the division of a few adhesions the tumor could be removed with practically no touching of the cord itself. The patient made a very good recovery.

"This case proved the correctness of the theoretical considerations, and we applied the method to other cases of intramedullary tumors. We have called the method 'the method of extrusion.'

"Based on the anatomic grounds described in the early part of this paper, and on the physical process above described, I desire to recommend the method of extrusion for the treatment and removal of intramedullary tumors of the spinal cord. If, after laminectomy and incision of the dura, the surgeon finds that he has to deal with an intramedullary growth, he should make a short incision about 1 cm. long, in the posterior median column a few millimeters outside of the posterior median fissure, at the spot where the growth seems to be nearest the surface of the cord. The incision should be deep enough to divide the pia and the substance of the column down to the tumor. The tumor will then begin to bulge through the incision. No matter how markedly the tumor will protrude, the surgeon must not attempt to remove the growth, for fear of grave injury to the cord. The operation must be concluded for the time being, the dura left wide open, the muscles, fascia and skin carefully closed, and the actual removal of the growth left to a second operation. After about one week, the wound is reopened, and the tumor, which will in all probability be found outside of the cord, can be removed by dividing the few adhesions which remain. When the tumor has been removed, the opening in the pia may be closed by a few very fine (split-silk) sutures, and the dura, muscles, fascia, and skin closed in the usual manner.

"If, at the second operation, the tumor is found to be still closely connected with cord tissues, it is advisable to leave it *in situ* and not attempt its removal. In one instance, an intramedullary fibrolipoma, I made the error of attempting to remove a small part of the tumor which was still closely connected with the cord, and caused the symptoms of a transverse lesion, which had existed before the extrusion of the tumor, to reappear. In several later cases, having learned my lesson, I allowed the tumors to remain and left the dura wide open. These patients have improved so much that a later operation seemed unjustifiable. Cushing has had a similar experience.

"In the case of intramedullary tumors which extend over a large number of segments, and which infiltrate the cord substance, a small incision into the cord made in the manner above described at the level of the most marked symptoms may allow of the partial extrusion of the tumor, with amelioration of the symptoms.

"Up to the present time I have applied the principles of intramedullary surgery above laid down to eleven cases of intramedullary diseases—eight cases of intramedullary tumor, two cases of hydromyelia and intramedullary cyst formation and one case of syringomyelia with marked glia formation. In all of the patients who could be followed for long periods of time, there was a very decided and in some of them a very marked improvement. As most of the cases have been reported elsewhere, I shall give only the synopses of the histories in this place.

"Case I. Intramedullary glioma of the cervical cord; laminectomy, incision of cord, extrusion of tumor, removal; recovery. Result, very marked improvement with return of power in all extremities. Patient returned to her work.

"Case 2. Intramedullary glioma of cervical cord; laminectomy, incision of cord, extrusion of tumor, removal, death in four hours from respiratory paralysis.

"Case 3. Intramedullary sarcoma of cervical cord;

laminectomy (Dr. Beer); extrusion, removal, recovery. Result, marked improvement; later, recurrence, operation, removal of recurrent tumor mass; no improvement.

"Case 4. Infiltrating tumor (glioma) of upper cervical cord and medulla oblongata; laminectomy and incision of cord; partial extrusion of tumor; death after two days from respiratory paralysis. Post-mortem showed that the tumor extended into the medulla and had grown through the posterior surface into the posterior cranial fossa.

"Case 5. Hydromyelia, laminectomy, incision of cord, drainage of cord cavity into subdural space. Result, great improvement of complete paralysis of lower and partial paralysis of upper extremities, so that patient is up and about and has returned to his work.

"Case 6. Intramedullary tumor of cervical cord; laminectomy, incision of cord, partial extrusion of diffuse tumor of cord; some improvement.

"Case 7. Syringomyelia; gliosis cervicalis; laminectomy, incision of cord in cervicodorsal region for decompressive purposes; marked improvement in power of upper extremities.

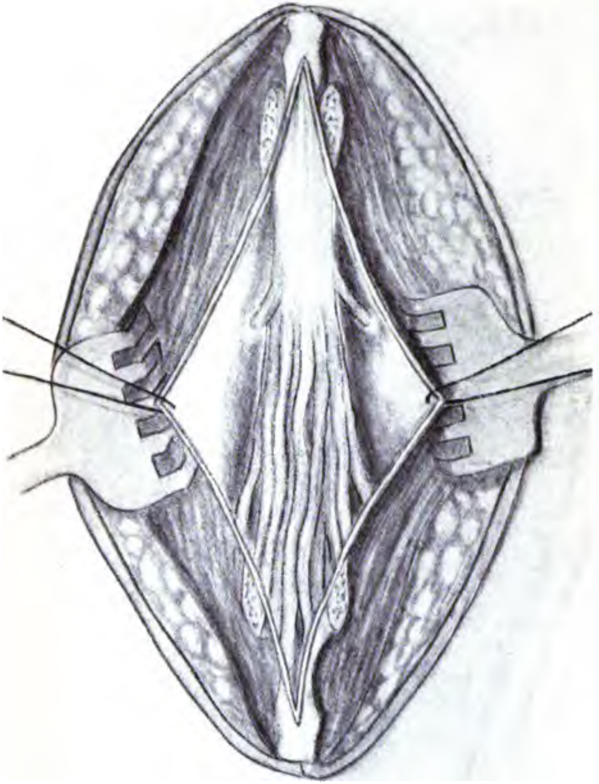
"Case 8. Diffuse meningomyelitis with intramedullary cyst; laminectomy, incision of cord, drainage of intramedullary cyst; no improvement. Death three months later from exhaustion; post-mortem showed extensive lesions throughout dorsal and lumbar cord.

"Case 9. Intramedullary lipoma of cervical cord; laminectomy, incision of cord, partial extrusion of tumor. Great improvement so that quadriplegic patient has recovered almost complete power in the upper and much power in the lower extremities.

"Case 10. Intramedullary fibrolipoma of cervical cord; laminectomy, incision of cord, extrusion of tumor, great improvement in symptoms with disappearance of paralysis of upper and improvement in paralysis of lower extremities. Later, removal of tumor, which is not entirely extruded from the cord, followed by symptoms of transverse myelitis. Thereafter slow improvement.

"Case 11. Intramedullary fibrocyst of cervical cord; laminectomy, incision of cord, extrusion of cyst, removal

PLATE VI.



Congestion of the cauda equina. The cauda fibers shown were bright red.—Kennedy, Elsberg and Lambert. (Page 113.)

at second operation, almost complete recovery, continuous improvement."

## The Cauda Equina.

**A Peculiar Undescribed Disease of the Nerves of the Cauda Equina.** Foster Kennedy, Charles A. Elsberg and Charles I. Lambert[7] describe what they believe to be a definite clinical and pathologic entity which they have encountered five times in eighty-four cases in which laminectomy was performed. Both the clinical histories and the findings at the operations are strikingly similar in all of the cases.

"Anatomic findings. The conditions found at operation were the following: In two patients a large number of the caudal roots and in the other three all the roots were swollen, congested, and of a bluish-red color. The difference between the color of these nerves and the color of the normal nerve roots was striking and easily recognizable. The changes seemed to be due to an intense hyperemia on the surface of the nerves, and extended into the nerves themselves. In one patient (Case 4), in whom a piece of posterior root was excised for histologic examination, the entire nerve on cross-section looked discolored. Fine blood-vessels hardly visible to the naked eye could sometimes be traced upward on the nerve roots to the conus, where they formed a fine net-work in the pia mater.

"Adhesions between the nerve roots were present in only one case; in the others the only changes were swelling and discoloration.

"In all five patients, the inner surface of the dura was smooth and glistening, and without signs of inflammatory change though in two of them a few small areas of hyperemia were observed. No gross change was observed in the conus or lumbo-sacral cord.

"The cerebrospinal fluid was normal in appearance in four patients, while in one the color was more yellow than is usual. The amount of fluid which escaped when the dura was incised was considerable in several of the cases, but was no more than one often finds within the dural sac.

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(7) Amer. Jour. Med. Sci., 1914, Vol. 147, p. 645.

"Analysis of signs and symptoms. The histories of these five patients, while they are spread over various periods of time, are almost exactly alike in the nature and sequence of incident. In the third and fourth patients the symptoms were progressive in each for about two years, in the second for about one year, and in the first for but six months.

"Pain was present in all from the beginning; it was sharp, shooting, and burning in character, and was felt almost entirely in the backs of the thighs and in the calves. By the last patient it was described also as needling and cramp-like. In the first four patients the pain was, at the beginning, strictly unilateral, being felt in both legs after the lapse of some weeks or months. The leg first involved remained throughout the illness more affected than its fellow. All but the third patient complained much of tingling and numbness, involving sometimes the feet, sometimes the knees, and in the last two patients the entire surface of the lower extremities.

"Atrophy of the anterior tibial muscles, with loss of the power of dorsiflexion at the ankle, was a prominent feature in four of the series; in the exception (Case 3) there was a spasticity of the lower extremities, which was more marked on the right than on the left side. This was an important deviation from the symptom-complex, as we have become accustomed to recognize it, but the characteristic pains, the sensory changes, and the lesion of the caudal roots, identical with those of the other patients, furnish just evidence for the alignment of this patient in our series.

"The objective sensory changes showed an astonishing uniformity; in all, the main incidence of the disease had fallen on the lowest roots of the cauda, the sacral roots were always affected, and with the utmost severity. In one patient (Case 3) all the lumbar roots were also involved though to a somewhat lesser degree than were their more lowly placed fellows. In three only had the lowest lumbar roots become diseased to such an extent as to abolish or depress function.

"As would be expected, the more markedly the lower sacral roots were involved the more complete was the sphincter disturbance. The disorganization of the functions of the bladder and rectum was complete in all but the third case, in which precipitancy and frequency of micturition prevailed. In that case, however, the destruction of function of the roots as gauged by the morbid sensory findings, while more diffuse than in any of the others, was considerably less complete.

"The first, third, and last cases showed that the disease had produced destructive changes in the cord itself; in them the plantar reflex was of the pathologic extensor type.

"The abdominal reflexes were present in all of the patients. In but one were the ankle-jerks obtained in the affected limbs. The knee-jerks became lost, as in the last case, coincident with the upward progress of the disease.

"None of the patients gave either a history or indication of luetic infection. In all, the Wassermann test was carried out in both the blood and cerebrospinal fluid, with completely negative results in every instance.

"In only one case did the cerebrospinal fluid give any indication of the presence of a disease condition within the dura, and in it (Case 2) it was of doubtful interpretation, showing a negative Wassermann test and an increased amount of globulin, with twenty lymphocytes per cubic centimeter, a cytologic count insufficient to accompany any tuberculous process."

On account of the similarity of the cases it will suffice to quote the detailed description of only one, namely: Case 2 in the paper.

"The patient was a married woman, 37 years old. She was first seen on May 21, 1912. Two years before the patient had an attack of pain in the right thigh, shooting from the hip and lasting nine weeks. About one month later she had another slight attack of pain, and thereafter had some pain off and on up to the time of coming under observation. About eight months before she began to have pain in the small of her back and in her rectum. Later she was more than usually constipated. In January she had noticed that both lower limbs felt weak; had considerable pain in the left leg and numbness in both knees.

"In April an abdominal hysterectomy was done, on account of difficulty with her bladder and rectum. She recovered satisfactorily from the operation, but her symptoms were unrelieved and steadily became worse. After operation she had retention of urine for three days, then she regained control of her bladder for two weeks; from that time on she lost all control of that organ and had to be catheterized. From May 14, she had severe shooting pain in the right leg and in the back, and noticed that her right leg felt stiff when she attempted to move it, and that she did not feel the catheter when the urine was withdrawn. Her bowels were constipated, excepting after a cathartic, when incontinence prevailed. She was confined to bed for several weeks before our seeing her, on account of the pain and weakness of her lower limbs.

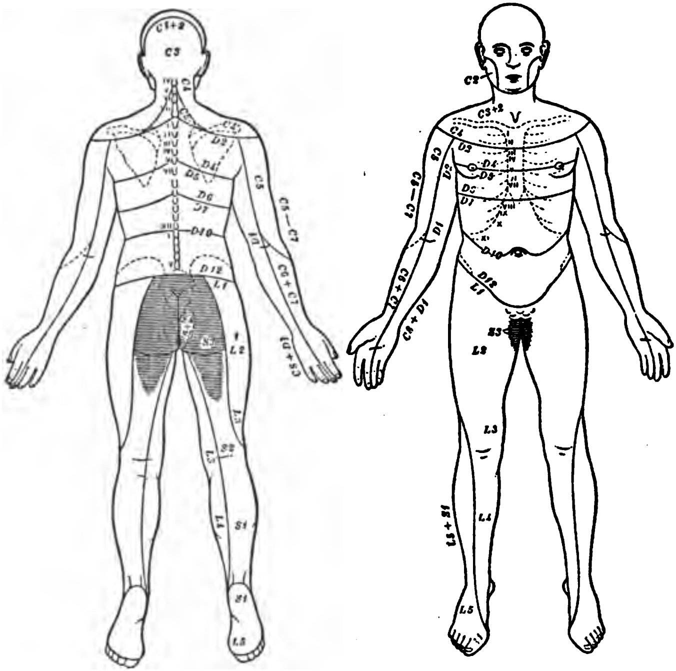
"On examination the patient was a woman of small stature and slight build. Cranial nerves and upper extremities were normal.

"Abdominal reflexes were present and equal.

"Flexion of the right thigh at the hip and dorsi flexion of the right foot was weak. Knee-jerks were present and equal; ankle-jerks were present on the left, could not be obtained on the right side. The muscles of the right thigh were flabby. There was no loss of deep muscle sense in lower limbs.

"At a second examination several days later, ankle-jerks on both sides could not be obtained; there was a loss of all sensation over the second, third, fourth and fifth sacral areas on both sides. Wassermann test was negative; fluid obtained by lumbar puncture was of a light yellow color; globulin increased, 20 cells to the cubic millimeter; *x*-ray examination was negative.

"June 18. Laminectomy (Dr. Elsberg). The removal of spinous processes and laminæ of the eleventh and twelfth dorsal, and the first, second, and third lumbar vertebræ was performed in the usual manner; when the dura was incised, considerable fluid escaped, and the roots of the cauda equina were found deeply congested and of a reddish-blue color. Numerous tortuous vessels ran between the nerve roots. The inner surface of the dura showed a few small spots of congestion,



Shaded area shows distribution of sensory disturbance in Case 2, reported by Kennedy, Elsberg and Lambert.

but everywhere it was smooth and glistening. All sides of the nerves of the cauda, of the conus, and of the lumbo-sacral cord were examined, but no evidence of a tumor, of a bony abnormality, or other lesion could be found. A probe was passed upward and downward without meeting any obstruction. After the toilet of the wound, bichloride of mercury solution, 1 to 500 was rubbed on the nerve roots, and the dura, muscles, fascia, and skin closed in the usual manner. Duration of the operation, forty minutes. (Plate VI.)

"Convalescence from the operation was uneventful; the wound healed by primary union.

"June 26. For the past few days the patient had been able to feel when her bladder was distended. She once passed several drams of urine voluntarily. After taking a cathartic she still had incontinence of feces. Had not had any pain in her lower limbs since operation.

"September 1. Had gained almost complete control of her rectum, and at times could pass urine voluntarily. Was free from all pain. Both ankle-jerks present, but weak.

"February, 1913. General condition was excellent; had gained much flesh and strength. Passed urine without trouble, but had four to six ounces of residual urine, and had to be catheterized occasionally. She had considerable sensation when her bladder was distended and some urethral sensation had returned. Bowels moved well after small doses of cascara, and she was conscious of the desire to go to stool. Had occasional pain in her right leg. Knee-jerks were lively and equal; left ankle-jerk was lively, right was weak, but distinct. There were irregular areas of diminished sensation over the third, fourth, and fifth sacral areas, but they were indefinite, and their limits could not be mapped out. In some parts of these areas sensation was good while in others it was poor. Vulva was sensitive to touch and pain. Patient said she felt the catheter plainly when it was inserted and withdrawn. Could recognize the temperature of an enema, and declared that she was much better than when last seen."

In Case 5, death occurred soon after the operation. The tissues were examined by Dr. Charles I. Lambert, who reported finding evidence of arteriosclerosis in the region of the cauda equina, evidence of degeneration in the cells of the posterior root ganglia of the cauda and degeneration of the posterior lumbo-sacral roots themselves. The conclusion is that the condition in these cases is probably one of toxic neuritis of the caudal nerve roots. Search of the literature fails to reveal any proved cases of the same kind, but similar discoloration of the cauda has been seen in horses by Marek.[8]

The animal began to have colic and to suffer from constipation. Later it developed marked weakness of the hind legs and retention of urine, with loss of sensation around the buttocks, in the anal region, and down

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(8) Zeitschr. f. Thiermedizin, 1909, XIII, 33.

the backs of both thighs. The patellar reflexes were depressed. The horse was killed, and at autopsy a marked congestion of the cauda equina and the surrounding pia mater was found. There was considerable connective tissue proliferation around the red and swollen lumbar and sacral nerve roots. A collection of blood external to the spinal column was evidently the result of an old trauma. Histologically, the roots showed intense congestion and small round-cell infiltration, with disappearance of many of the nerve fibers. There was some ascending degeneration in the posterior columns of the lower dorsal and lumbo-sacral cord.

## DISEASES OF THE PERIPHERAL NERVES.

**The Etiology of Oriental Beriberi.** As president of the board for the study of tropical diseases in the Philippines, Weston P. Chamberlain,[2] Major, Medical Corps U. S. Army, directed an extensive investigation of beriberi as seen in the Philippines. As to the hypothesis of the disease being caused by a diet of polished rice, he is convinced that it holds for a certain proportion of cases; in fact that it holds for the disease as commonly seen in the orient.

"If a fowl is confined in a cage and fed on an exclusive diet of the ordinary commercial rice sold in the United States, the muscles of its legs will become paralyzed after a period of about one month. This condition is the so-called polyneuritis gallinarum. It is a degenerative process occurring in the cord and in the peripheral nerves, but generally most manifest in the motor neurons of the legs. Usually there is some involvement of the pneumogastric nerve, and this lesion, if well-marked, probably causes the cardiac and pulmonary symptoms which simulate the pernicious attacks of beriberi seen in man. The degeneration is undoubtedly due to the absence from the diet of some substance essential to nerve nutrition.

"Identical results can be obtained by feeding fowls on certain other restricted and deficient diets.

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(2) New York Med. Jour., February 7, 1914.

"If a man subsists on a diet consisting mainly of the same kind of rice referred to, beriberi will develop after a lapse of about eighty days. The symptoms manifested will closely resemble those seen in the fowl, and the lesions in the nervous system are identical. The similarity in the etiology, in the pathology, and in the symptomatology of the two conditions, leaves little room for doubt that in beriberi and in polyneuritis gallinarum we are dealing with essentially the same pathologic process.

"If a woman eating this same kind of rice diet gives birth to a child, and continues to suckle it, the infant in a large number of instances will manifest a disease which is extremely common in the Philipines under the name of *taon*, and which is believed to be infantile beriberi. This malady is the most prolific cause of the frightfully high mortality among breastfed Filipino babies. The disease is generally fatal if nursing is continued, but recovery is nearly always prompt when the child is placed on a diet of canned milk or fresh cow's milk. In many instances the mother manifests early or rather advanced signs of beriberi. In other cases she appears healthy.

"Instead of using the commercial snowy white article familiar to us in the United States, we may employ a grade of rice having a part of the inner skin, or pericarp, left on the kernel. Subsisting on such a grain, the chicken and the man remain well. If to the chicken, which is being fed on the snowy white commercial rice, there is administered a daily dose of the pulverized skin ('polishings') which had been milled off its rice, then the fowl remains in perfect health indefinitely. An alcoholic or an aqueous extract of this skin exerts the same protective influence on fowls. If the baby with infantile beriberi is given this same extract of rice polishings, while continuing to be nursed by the mother, its recovery is as prompt and marvelous as that seen when fruit juice is administered for the cure of infantile scorbutus.

"The use of this rice with the skin or pericarp remaining on the kernel has led to a great reduction or to a complete disappearance of beriberi in many places in the orient where it has been tried. The most conclusive evidence has recently been submitted by Heiser. At the Philippine Leper Colony at Culion beriberi was rife until unpolished rice was substituted for the polished grain which formerly constituted the bulk of the ration. The disease then disappeared and remained absent for two years. As a result of economic factors it then became necessary to sustain the patients on polished rice. Beriberi began to appear in about two months thereafter, and a total of 111 deaths occurred from this cause. About three months later unpolished rice was again put into use and new cases of beriberi ceased to appear. An exactly similar incident has been described in an asylum in Siam, beriberi reappearing in seventy-four days after a diet of polished rice was resumed. Its occurrence was checked by the use of polishings and undermilled rice."

[The relation of diet to beriberi was discussed at some length in the Practical Medicine Series, 1912, vol. 10, p. 167, and 1913, vol. 10, p. 153.] At the end of the article the author discusses other etiologic factors as follows:

"In some instances, particularly in certain asylums, on ships, and in South America, a disease called beriberi is reported to occur among persons who eat little or no rice. Three explanations of these facts may be offered: First, the dietary may be an unbalanced one, lacking the neuritis-preventing substance, even though it is not a rice diet. Secondly, the neuritis-preventing principle originally present in the food may have been destroyed by excessive heat, for instance by cooking with steam under pressure. This possibility appears to have received no investigation. Thirdly, the term 'beriberi' may include several varieties of peripheral neuritis caused by different factors. Instances of neuritis due to poisons, such as lead, arsenic, and alcohol, and to toxins produced by bacteria, such as the typhoid and the Klebs-Loeffler bacillus, are well known. That a diet of rice deprived of its pericarp will produce one type of neuritis in man, as well as in fowls, seems fully established. But it by no means follows that there may not be still other types of endemic tropical neuritis, each presenting a symptom complex not readily to be distinguished from that of oriental beriberi, and each having a distinct etiologic factor which still awaits discovery."

**Beriberi in Newfoundland and Labrador.** J. M. Little, Jr.,[3] finds that this disease is fairly common among the crews of Newfoundland fishing vessels which go far north, away from the base of supplies. The author believes that beriberi is one of the deficiency diseases and develops whenever man is for a sufficient time deprived of the elements of his diet which have been called vitamines. He finds that, when a patient with beriberi whose symptoms have not gone so far as to be immediately dangerous, is put on a diet including fresh meat, whole wheat bread, beans, peas, macaroni and tomatoes he will recover within 10 days from all functional symptoms. His perfect recovery will depend on the length of time necessary for the regeneration of the nerves already affected, together with the correction of such pathologic conditions of deformity as wasting, anaemia, etc., as have supervened.

*The relationship between beriberi and scurvy* was discussed at length in the Practical Medicine Series, 1912, vol. 10, p. 167, in connection with a report by A. Holst of Norway. Now the same subject is discussed by S. T. Darling,[4] who studied scurvy during a visit to South Africa with General Gorgas. Several necropsies were made and Darling was struck by the remarkable appearance of the heart, which suggested that seen in beriberi with marked right-sided hypertrophy and dilatation. These cardiac lesions were found in every case and microscopic examination showed degeneration of the heart muscle and of the branches of the vagus nerves. After considering the literature and describing his clinical and post-mortem observations, Darling concludes that the striking excentric hypertrophy and dilitation of the right heart with extensive fatty degeneration of the same musculature, the left heart remaining apparently normal, and the severe degeneration of the vagus nerve furnish new and additional facts which show the intimate relationship between scurvy and beriberi as to etiology. The affinities between these two diseases and

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(3) Jour. Amer. Med. Ass'n., October 10, 1914.
(4) Jour. Amer. Med. Ass'n., October 10, 1914.

certain other cachexias lend emphasis to the opinion that they are all the result of the continued use of one-sided and deficient diet.

**The Regression of Traumatic Paralysis of Peripheral Nerves.** This subject has been studied on a very large material by Kutner[9] of Breslau. He finds that, at least in the case of many nerves, there are certain rules governing the return of function.

In musculo-spiral paralysis caused by injuries above the elbow the extensor carpi radialis muscles showed return of power weeks before any others. The supinator longus and supinator brevis came next, followed by the extensors of the fingers. In the thumb, the extensor pollicis longus always showed signs of recovery a few weeks before the abductor longus and the extensor brevis. The last muscles to recover were the extensor carpi ulnaris, the abductor pollicis longus and the extensor pollicis brevis. Return of normal electric reaction occurred in the same order and usually some weeks after return of function.

In ulnar and median paralysis, no rules could be formulated.

In paralysis of the circumflex nerve the posterior portions of the deltoid always recovered first. In connection with deltoid paralysis it is stated that the patients usually came with the diagnosis of slight ankylosis of the shoulder following injury. As a rule they could raise the arm to the horizontal and sometimes even higher, but on passive motion one would find that the shoulder-joint was wholly or partly stiff, that by active raising of the arm the deltoid remained flaccid and that the deltoid showed the reaction of degeneration. The raising of the arm was wholly accomplished by rotation of the scapula by means of the serratus and upper third of the trapezius and with the shoulder-joint stiff the arm would naturally be raised. In some cases with partial mobility of the shoulder, the head of the humerous would be fixed by the supraspinatus. These phenomena are of interest in pointing a way to treatment of irreparable deltoid paralysis by means of arthrodeses of the shoulder.

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(9) Neurol. Centralbl., 1913, Vol. 32, p. 1229.

In paralysis of the peroneal nerve function always first returned to the peroneus longus; then followed the tibialis antieus and the extensor longus digitorum.

The material did not suffice for the formulation of similar rules in the cases of other nerves, but the results would seem to show that the nerve bundles destined for different muscles lying in certain nerve trunks are in different conditions of excitability, which may have some connection with the fact, pointed out by Stoffel, that the fibers going to certain muscles occupy certain positions on the cross section of the peripheral nerves.

Cutaneous sensation was always disturbed as all of the cases included were instances of total paralysis which never came under observation until some weeks after the injury. In cases of ulnar and median paralysis the area of tactile anesthesia usually corresponded to the known area of distribution of these nerves on the hands and fingers, while the area of diminished pain and temperature sense was considerably smaller. In most cases of median paralysis the ball of the thumb showed normal sensibility. In musculo-spiral paralysis the anesthetic area was always much smaller than the area of distribution. The regression could only be followed for a sufficiently long time in a few cases. Nearly always the zone of disturbed pain and temperature sense would first contract. After freeing of nerve trunks compressed by callus this disturbance sometimes disappeared in a few weeks, while the loss of tactile sense usually lasted for several months and in some cases of nerve suture a light diminution of sensation would remain for over a year.

**Experimental Study of Intra-neural Injections of Alcohol.** In recent years injection of alcohol into sensory nerves for relief of neuralgia has become deservedly popular as has the treatment of facial spasm by injection into the facial nerve at the stylo-mastoid foramin. Alcohol has also been injected into mixed or motor nerves for the relief of spasticity, contractures and athetoid movements. It is of interest to know just what happens in the injected nerves and what the chances of doing permanent damage may be. We should be grateful, therefore, to Alfred Gordon,[1] who has performed experiments on dogs in order to solve these problems. He injected five drops of 80 per cent. alcohol into the infra-orbital, facial and sciatic nerves, respectively sensory, motor and mixed nerves. Three dogs so injected were kept alive for nine days and another three dogs for twenty-nine days. The purpose of determining the relative vulnerability of the three types of nerve seems to have been accomplished for the author is able to formulate the following conclusions:

1. There is a difference in histologic changes when alcohol is injected into a motor, a sensory or a mixed nerve.
2. A motor nerve is considerably less influenced by the intimate contact with alcohol than a sensory or mixed nerve.
3. Functional recovery follows in cases of injections into a motor nerve.
4. In cases of sensory or mixed nerves, persistent sensory, trophic and motor disturbances follow injections of alcohol.
5. In cases of motor nerves the gross nerve bundles are not affected. Only the perineural connective tissue suffers, but a condition of repair is evident in cases of long standing.
6. In cases of sensory or mixed nerves the histologic changes are very conspicuous, not only after recent injections (nine days) but also long after the first injection (twenty-nine days). Not only the nerve bundles themselves, but also their respective ganglia (Gasserian and spinal), show distinct evidences of degenerative changes.
7. In therapeutic management of affections of nerves, the above difference in the susceptibility of motor and sensory nerves to the effect of alcohol must be borne in mind. Otherwise irreparable damage may be done to muscles and limbs supplied by those nerves.

**The Symptomatology of Trifacial Neuralgia.** Hugh T. Patrick[5] has studied the symptoms in 200 personal

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(1) Jour. Nerv. and Ment. Dis., 1914, Vol. 41, p. 81.
(5) Jour. Amer. Med. Ass'n., May 16, 1914.

cases, ninety-six men and 104 women. In view of the general opinion that the malady is essentially one of the declining years the following table of the *age at onset* is most valuable:

TABLE 1.—AGE AT ONSET OF TWO HUNDRED CASES.

| Decade. | Number. | Per cent. |
|---|---|---|
| First | 1 | 0.5 |
| Second | 3 | 1.5 |
| Third | 11 | 5.5 |
| Fourth | 37 | 18.5 |
| Fifth | 56 | 28 |
| Sixth | 59 | 29.5 |
| Seventh | 25 | 12.5 |
| Eighth | 8 | 4 |

The one case with onset in the first decade is so unusual that the author's brief account of it is here quoted:

"Case 1. The first patient was 34 years old when first seen by me, at which time the disease was typical. He had been operated on nine times for the pain and twice for closure of a salivary fistula incidentally caused by one of the other operations. The operations for pain were followed by relief for about the usual period. I had him under observation for more than two years, relieved him by injections of alcohol, and the diagnosis never was in doubt. Of course, I have only his statement as evidence that the disease began at the age of 7, but he gave such a straight and characteristic history that I see no reason to doubt it. For the first four years he suffered for only a week or two each year—intervals which are not at all unusual in this disease—and the pain was confined to the right inferior maxillary branch. After that the periods of pain became more frequent and prolonged and spread to the middle branch. Throughout, the pain showed the peculiar, almost pathognomonic features."

In three cases the disease began at the age of 75 and in 57.5 per cent. it began between the ages of 40 and 60.

*Side affected.* In 62.4 per cent. of the cases the trouble began on the right side. In 37.1 per cent. on the left and in one case or .5 per cent., simultaneously on both sides. The figures for Patrick's cases at the time when they came under observation are as follows: right, 52.3 per cent.; left, 40.9 per cent; bilateral, 6.8 per cent. Compared with the experience of others this is a high proportion of bilateral cases. In no case, however, was there severe neuralgia on both sides at the same time.

*Branch involved.* Much-needed attention is called to the current misconception that true trifacial neuralgia involving the supra-orbital branch is relatively common. Patrick's statements on this point are as follows:

"The trouble began in the supra-orbital branch in only 8.5 per cent. of the cases, in the middle or infra-orbital branch in 49 per cent., in the third or inferior dental division in 25 per cent., and in two or more branches 7.5 per cent. But even this small percentage for the first branch is greatly reduced if we analyze the cases as seen. In only two (1 per cent.) of the 200 cases when first examined by me was the pain limited to the first branch. Could all of the patients have been seen at the time of onset, I believe that the foregoing 8.5 per cent. would be considerably reduced because of a strange peculiarity of this disease, which will be described below but may be mentioned here. In some cases, while the pain is particularly troublesome in the first branch, it really originates in the second branch, which was primarily affected but in which the pain is less severe. Later on, in giving the history of his trouble, the patient forgets the trifling pain in the middle area and states that the pain began in the supra-orbital region. I may add that others who in the last few years have studied this disease have come to a conclusion similar to mine. The cause of this gross error, I believe, lies in the former confusion of migraine (long popularly known as 'neuralgic headache'), the pain of sinus disease and probably supra-orbital herpes with true neuralgia."

The character of the pain, duration and course, complications and other clinical features are discussed.

**Direct Injection of the Gasserian Ganglion with Alcohol** by Härtel's method was described in detail in the Practical Medicine Series, 1913, Vol. 10, p. 142. In a later publication Härtel(6) again gives directions for the injection, which is made through the foramen ovale.

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(6) Med. Klin., April 5, 1914.

Much stress is laid on the after-treatment. The patient should remain in the recumbent position for at least one hour after the injection and stay in the room for ten days. The eye on the side injected is protected by a watch glass and twice daily 3 per cent. boric-acid vaseline is applied. If the slightest redness appears, 0.5 per cent. atropine is instilled into the eye. After eight days, goggles replace the watch glass, and a few weeks later the patient is allowed to use ordinary spectacles, which are worn permanently.

[The reason for the scrupulous care of the eye lies in the fact that injection of the Gasserian ganglion, like removal of the ganglion, is invariably followed by anesthesia of the eyeball as well as of the rest of the area supplied by the trigeminal nerve.—Ed.]

Härtel, up to the time of writing, had treated twenty-four patients by this method with relief in all cases, but as the first treatment had only been given fifteen months previously, it is of course too early to judge the permanent results. As with deep alcohol injections of the nerve trunks, more than one injection, usually two or three, are required. Fourteen of the twenty-four patients submitted to a sufficient number of injections to obtain a complete anesthesia. They have remained free from pain, except two female patients afflicted with hysteria, in whom the paresthesias following the injection gave rise to much complaint. Of the ten patients with imperfect anesthesia, five remained well, two developed slight recurrence of pain and three had severe paroxysms after four or five months, but were completely relieved by subsequent injections.

As to the dangers of the method, the only serious one is that of corneal ulceration (keratitis neuroparalytica) already referred to. This complication has not occurred in any of the cases in which the after-treatment outlined above was carried out.

In the author's opinion, cases of trifacial neuralgia should be treated according to the following plan: Early cases may yield to internal and physical measures, respectively laxatives and hot air-current massage, and Bier's method. Peripheral and central novocaine injections are also useful at this stage. Protracted neuralgia limited to one or two branches is treated with peripheral or deep alcohol injections of the nerves affected. Severe and extensive neuralgias, especially when recurring after nerve injections, should be treated by ganglion injections, which are to be repeated until permanent anesthesia is obtained. The operative extirpation of the Gasserian ganglion should be reserved for cases in which the ganglion injections are anatomically impossible or ineffective after several repetitions.

**Experiences with Alcohol Injection in Trigeminal and Other Neuralgias** were related at the 1914 meeting of the American Medical Association by Wilfred Harris[7] of London. Like Patrick, Harris has treated some 200 cases of trifacial neuralgia, and, like him, he very rarely finds the supra-orbital nerve involved alone. After describing his experience with alcohol injections of the nerve trunks in which, in all essentials, he follows the technique of Levy and Baudouin, he discusses injections of the Gasserian ganglion, which he has made in over sixty cases.

Harris discovered that in injecting the inferior maxillary nerve at the foramen ovale, anesthesia would sometimes develop in the areas of the two upper branches of the nerve, indicating that the needle had passed through the foramen and entered the Gasserian ganglion. He does not state the exact technique employed in ganglion injections, but lays stress on the importance of injecting very slowly, only a few drops at a time, and to watch carefully the development of anesthesia. From 1 to 1.5 c.c. is usually required, but if a larger quantity is used there is danger of producing a permanent anesthesia of the eyeball, necessitating very careful protection of the cornea to avoid neuroparalytic keratitis.

Harris has found that after deep injections of the third division at the foramen ovale and after ganglion injections, loss of taste in the anterior half of the tongue develops. He has taken the utmost care in the testing of these patients, so there can be no possible doubt as to this result. The sensation of taste remains absent as long as the anesthesia of the third division persists, and he has seen loss of taste well marked as long as two years

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(7) Jour. Amer. Med. Ass'n., November 14, 1914.

after injection. With one exception, in all of his cases of injection of the Gasserian ganglion in which deep anesthesia of the whole fifth nerve area was produced, there was complete loss of taste on the half of the tongue. Harris is of the opinion that the immediate loss of sensation of taste produced by injection at the foramen ovale is certain proof that in the large majority of persons the taste fibers from the tongue pass along to the Gasserian ganglion by the third division, since the result is immediate and can not, therefore, be due to any vascular changes, the result of nerve degeneration, although Cushing has tried to explain the loss of taste following Gasserectomy in this way.

Bilateral trigeminal neuralgia existed in ten of Harris' patients, or 5 per cent.

In post-herpetic neuralgia, Harris has only seen aggravation of the pain following injection of the nerve and declares that such injection is irrational, as the lesion being an inflammation of the ganglion, is proximal to the point where the injection can be placed.

He has not yet performed injection of the Gasserian ganglion for herpetic neuralgia, though, theoretically, it might effect a cure, but not certainly so, as the lesion may be partly central and not confined to the ganglion. He has known division of posterior spinal nerve roots to fail to give relief in post-herpetic neuralgia of the trunk.

*Chronic fibrositis.* Harris finds that this condition of the shoulder, back, buttock and sole of the foot may sometimes derive almost magical relief from alcohol injection. In many cases in which the pain had continued for years, seven years in one case, he has seen it disappear instantly and permanently after injection. This is perhaps most striking in the cases of plantar fibrositis following rheumatism, the patients being hardly able to stand or to hobble about for months owing to the pain produced by their weight stretching the plantar fascia and ligaments. In five such cases he has produced instant relief, so that the patient could not only walk with comfort but jump about within five minutes of the injection. His method is to search for points of deep tenderness on pressure and mark them carefully. Then after sterilization with iodine he sinks a fine needle vertically down to the bone, injecting a few drops of novocaine on the way. After half a minute, 10 drops of 90 per cent. alcohol is injected, the needle withdrawn and the puncture sealed with collodian gauze. Sometimes three or four spots have to be injected, and occasionally a repetition is necessary the next day or later, when the whole of the affected area has not been covered. Harris finds that this method is not of any value in cases of diffuse tenderness, except when definite spots of intense tenderness are found. This is sometimes the case in fibrositis of the buttock, and occasionally it may accompany a true sciatica. In such cases great care must be taken not to inject the sciatic nerve itself with alcohol. He incidentally mentions that he has employed injections of novocaine in 50 to 100 c.c. of salt solution in sciatica.

In chonic brachial fibrositis, which is less common, Harris has successfully used alcohol injection in six cases; here again precautions must be taken against injecting a nerve trunk with alcohol. After sinking a needle to the bone in the required spot, he injects a few drops of novocaine solution, and if no motor weakness or anesthesia appears within a minute, alcohol is injected. In suitable cases of this type the benefit and relief are immediate and most striking.

In the discussion of Dr. Harris' paper, Dr. Charles R. Ball of St. Paul stated that in his experience, Dr. Harris' method of injecting the Gasserian ganglion from the point of entrance for the injection of the third branch is more practical and simple than the method proposed by Härtel. Dr. C. D. Camp of Ann Arbor reported success in three injections of the ganglion, using the Harris technique. His experience differed from that of Dr. Harris with respect to the sense of taste, as in all of his cases the sense of taste was preserved in the anterior two-thirds of the tongue, although there was complete analgesia in this region. No keratitis developed in any of Camp's cases.

**The Alleged Sensory Cutaneous Zone of the Facial Nerve.** In 1907, J. Ramsay Hunt described a new syndrome consisting of herpes of the external ear and meatus, neuralgic pain in the same region and facial paralysis, which he ascribed to inflammation of the geniculate ganglion. He believes that the facial nerve contains fibers of ordinary sensation which come from this ganglion, which is analogous to the Gasserian ganglion on the fifth nerve and the posterior root ganglia. This syndrome has been discussed at length in previous volumes of the Practical Medicine Series, 1907, vol. 10, page 175; and 1910, vol. 10, page 153. Hunt's syndrome was generally accepted by clinicians, especially as apparent relief from the pain was obtained in a case reported by Clark and Taylor, who divided the sensory root coming from the geniculate ganglion. However, objections have come from very important quarters. Thus, Charles K. Mills believes that the sensory branch of the seventh nerve is altogether given over to the sense of taste, and in this assumption he is supported by the workers in comparative neurology. Leonard J. Kidd[8] has submitted this whole subject to a thorough critical review and fails to find any proof for Hunt's contention. In the first place, comparative anatomists have shown that not only is there a total absence of any anatomic or experimental evidence in favor of the existence of a cutaneous facial nerve component in mammals, but there is not even any well-established instance of this in any vertebrate class above the cyclostomes. C. Judson Herrick of the University of Chicago states that there is no proof that the geniculate ganglion ever sends general sensory fibers to the skin; in all cases in which general sensory fibers are distributed to the skin by branches of the facialis they either have a separate root of their own, as in cyclostomes, or else enter the facialis distal to the geniculate ganglion by anastomosing branches from the Gasserian ganglion. After quoting this, Kidd remarks:

"If Herrick does not know of general cutaneous facialis components in any vertebrate above the cyclostomes, where shall we find a comparative neurologist who knows more about nerve components than he? Clearly, then, as the comparative neurologist does not know of a cutaneous facialis component in any mammal, it behooves the mere clinician to walk softly and ask

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(8) Rev. of Neurol. and Psychiat., September, 1914.

himself whether Ramsay Hunt's teaching will bear close scrutiny."

Kidd sifts the available human clinical and pathologic material, summing it up as follows:

1. We lack conclusive proof of an isolated geniculate herpes.

2. Geniculate otalgia is never, even in part, a cutaneous otalgia.

3. An isolated complete unilateral infranuclear facial palsy never gives anesthesia of any part of the auricle; such anesthesia would be present in every case if the geniculate ganglion sent any sensory cutaneous fibers to the auricle.

4. Those cases of Bell's facial palsy in which hypesthesia is found, often only after repeated and highly suggestible clinical testings, on either the whole or a large part of the trigeminus and cervical root areas or on part of the auricle, are always either due to a coincident sensory neuritis of trigeminus, cervical or vagus auricular branches, or else are psychogenic (*i. e.*, manufactured by the patient's reasoning suggested by the clinician's testing). It was to these or some of these factors that the sensory changes found in the cases by Dejerine, Tinel and Heuyer, by Souques, by Laignel-Lavastine and by Ramsay Hunt were due, and not to involvement of any hypothetical (and non-existent) sensory cutaneous facialis fibers.

5. The afferent fibers which are contained in the trunk of the facial nerve of man, rabbit and monkey are non-sensory; they are purely postural-afferent in function and their functioning never rises into consciousness. The algetic afferent nerve fibers which are distributed to the facial muscles of man come from or through the Gasserian ganglion; it is solely on them that the muscle pain sensibility of the facial muscles depends.

**Intercostal Neuralgia.** This is discussed by Ernst Tobias.[9] A review of the literature discloses striking disagreement among the authors as to the frequency of the affection. While Valleix, in his enormous neuralgia material, had only twenty-five cases, twenty of them in women, and Oppenheim emphasizes the rarity of it,

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(9) Berlin klin. Wochenschr., May 4, 1914.

Janowski[1] had 280 cases among 31,000 nervous cases; in other words, 9 per cent. of his patients had intercostal neuralgia; 73 per cent. were women. Janowski lays stress on the diagnostic importance of the Valleix tender points and of hyperalgesia of the skin in the area of the affected nerves. Of his cases, 71 per cent. were on the left side, 16 per cent. on the right side and 13 per cent. bilateral. In 80 per cent. of the cases, neurasthenia and gout were predisposing causes. Acute infections, especially influenza and sore throat, are said to be the principal exciting causes. Zuelzer[2] of Berlin corroborates Janowski's claims for the frequency of the affection, but emphasizes that his observations were made at the time of an influenza epidemic. Tobias has sifted the material of a large dispensary in Berlin from 1901 to 1913, with an average number of 14,000 patients a year, with the astounding result that there were only five cases that could be considered intercostal neuralgia and three of these were instances of neuralgia following typical herpes zoster. Of the two remaining patients, one was a male neurasthenic, 33 years old, with dermographia increased tendon reflexes, meteorism and left-sided intercostal neuralgia. The other patient was a shoemaker, 39 years old, said to come of a "very nervous" family. Eight weeks before the first examination at the dispensary, he had suddenly been taken with severe pain in the region of the left scapula and extending to the axilla and chest. The pain was very severe, persistent pulling in character, and increased by motion and by sneezing. Examination revealed marked hypalgesia at the site of pain on the fourth to the sixth intercostal space. There was a slight difference in the radial pulses, accentuated second sounds and rapid heart action. The knee and ankle reflexes were absent and the Wassermann test with the blood was positive. A course of mercurial inunction caused the pain to disappear in a short time. Hence the only case of severe intercostal neuralgia observed in this large clinic in the course of twelve years turned out to be one merely symptomatic of spinal cord syphilis. In analyzing his private

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(1) Therap. d. Gegenwart, March, 1907.
(2) Therap. d. Gegenwart, May, 1907.

patients, Tobias finds quite frequent complaints of pain in the chest, especially in women, which superficially might be diagnosticated as intercostal neuralgia, but on closer examination it was found that the pain in most instances was the pseudo-neuralgia of neurasthenia and hysteria, while others were cases of neuralgia or of heart-neurosis. Eleven cases remained which deserve more special attention. Five of them were residuals of herpes zoster. One woman had a severe left-sided intercostal pain on a rheumatic basis, with permanent relief following treatment with intensive sweats and anti-rheumatic remedies. Two other women had bilateral intercostal pain dependent on chronic arthritic changes in the spine. Finally, there were three men with severe intercostal neuralgia and in all of them the *x*-ray revealed large aortic aneurysin. This striking absence of idiopathic intercostal neuralgia in such large clinical material is all the more significant, as Tobias found a very large proportion of other neuralgias, particularly those of the trigeminal and the sciatic nerves.

## MISCELLANEOUS.

**The Relation of the Myopathies.** This is the title of an important contribution by Wm. G. Spiller.[1] First, there are the congenital forms, usually non-progressive and caused by mere defect of certain muscles or by such defect associated with defect of the corresponding peripheral neurons. In the second and much more important class we have the acquired muscular atrophies, which also may be divided in two large groups, namely: the muscular dystrophies, in which the neurons remain intact, and the nuclear forms, in which the loss of muscle is dependent on atrophy and disappearance of the corresponding cells and fibers of the peripheral neurons.

The muscular dystrophies: Spiller finds the recent classification by Batten very useful. It is as follows:

1. The simple atrophic type, myatonia congenita or amyotonia congenita.
2. The pseudo-hypertrophic type.
3. The juvenile type (Erb).

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(1) Brain, 1913, Vol. 36, p. 75.

4. The facio-scapulo-humeral type (Landauzy and Dejerine).
5. The distal type (Gowers).
6. The myotonia atrophica type.
7. Mixed and transitional types.

To these Spiller adds a somewhat questionable type:

8. The true hypertrophic type.

A large portion of the paper is devoted to a discussion of myatonia congenita and the question of the propriety of including it under the myopathies as advocated by Batten but contested by Collier and Wilson.

[This disease has been considered in previous volumes of the Practical Medicine Series, especially 1910, vol. 10, p. 179; 1911, vol. 70, p. 185, and 1912, vol. 10, p. 178.]

While Batten feels justified in including myatonia in the dystrophies and to that extent simplifying our cumbersome nomenclature, Collier and Wilson enumerate the following features as distinguishing between true myopathy (dystrophy) and amyotonia (myatonia):

1. The myopathies are conspicuously familial diseases, whereas no familial tendency has been recorded in amyotonia.
2. The several types of myopathy often show familial relationship one with another, whereas no case of amyotonia has been reported in the myopathic family.
3. A large majority of the cases of amyotonia are congenital, the condition being obvious at birth. In a majority of cases amyotonia has appeared acutely and has reached its most severe degree in a few days. In none of its several types is myopathy present at birth, nor does it ever appear acutely or reach its maximum in a few days.
4. The characteristic muscular flaccidity is not present in myopathy.
5. The local muscular wasting that is a marked feature of myopathy is not present in amyotonia.
6. The course of myopathy is one of progressive muscular weakness; that of amyotonia is one of progressive amelioration of the symptoms.
7. Return of the deep reflexes after their persistent absence for months or years has been recorded several times in amyotonia and has occurred in two of the cases

reported by Collier and Wilson. Such a return of an absent deep reflex has never been recorded in myopathy.

To these distinctions Spiller suggests adding two others presented by Collier and Holmes:

8. Affection of the periphery of the limbs and especially of the intrinsic hand muscles which is the invariable rule in amyotonia is of the greatest rarity in any form of myopathy.

9. Amyotonia never spreads to regions previously unaffected. Slow spreading of the affection from muscle to muscle is characteristic of all forms of myopathy.

The statement of Collier and Wilson that there is no familial tendency in amyotonia is contradicted by Batten, and so far the question can not be considered settled. The diagnosis of amyotonia is not only difficult as against such slow processes as muscular dystrophy and the Werdnig-Hoffmann type of neuronic (myelopathic) muscular atrophy, but occasionally, according to Spiller, acutely developing cases of amyotonia may be confused with anterior poliomyelitis and post-diphtheritic multiple neuritis. Collier and Wilson state that the strict symmetry of amyotonia on the two sides, the absence of local muscular atrophy, the absence of complete paralysis, and the absence of the rapid narrowing down of the extent of the regions affected tend to distinguish amyotonia from poliomyelitis. Diphtheritic paralysis is rare during the first year of life, when amyotonia usually develops, but the throat involvement may have been overlooked and the nasal regurgitation and cardiac debility, while usually prominent, may not be conspicuous in all cases of diphtheritic neuritis.

"Diphtherial palsy becomes especially important in connection with Bernhardt's views regarding amyotonia. He believes a multiple neuritis or an arrest in the development of the nerves is more likely to be the cause of amyotonia than an arrest in the development of the muscles. The improvement which occurs in this disease can be explained better by nerve disturbance than by muscle disturbance. He acknowledges that disease of, or deficient development of, the nerves in amyotonia has not been determined. He has shown that multiple neuritis may occur in the first years of life, and the cases he reports bear a striking resemblance to amyotonia. Slow contraction of the affected muscles in amyotonia by direct galvanic current he says was observed once by Oppenheim and in one of his own cases. We must therefore acknowledge that multiple neuritis developing in the first year of life, at least as early as the fourth month, may cause a clinical picture apparently indistinguishable from amyotonia, and the neuritis is not necessarily from diphtheria. In one of Bernhardt's two cases, recovery strengthened the diagnosis of neuritis, as recovery would be less likely to occur in a disturbance of the muscles than in one of the nerves."

Attention is called to the fact that muscular dystrophy may develop acutely, and a few cases of recovery have been reported, which, of course, would suggest that the disease really had been multiple neuritis, although some of these cases appear to be genuine. Like multiple neuritis, myopathy has been reported by Guillain and others as following typhoid fever and other infections, and amyotonia has been reported as following pulmonary infections. Anatomically, there are also many transitional cases, such as cases of myopathy with changes in the peripheral neurons, and in amyotonia changes sometimes have been confined to the muscles, while in others the cells in the anterior horns of the cord have been affected, in some cases so intensely that distinction from the Werdnig-Hoffmann type may be difficult. The chief distinguishing features of the latter disease are heredity, progression of the disease, reaction of degeneration, and commencement in the proximal parts of the limbs. Spiller quotes at length the views of different authors, which show that these disease types are far from settled.

Myotonia atrophica is a rare disease, from seventy to eighty cases having been collected by Hoffmann in 1912. Batten and Gibb[2] regard it as a form of myopathy. They state that the myotonic features in many cases are very limited in distribution and occur after the muscular wasting has been present many years. They admit that muscular atrophy may develop in typical cases of Thomsen's disease (myotonia congenita). The muscular atrophy they find as a characteristic distribution, involving

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(2) Brain, 1909, Vol. 32, p. 187.

the face, sterno-mastoids, the vasti muscles of the thighs and the dorsal flexors of the feet. The masseter and temporal muscles are sometimes affected, as are also the extensors and flexors of the forearm. The disease tends to affect members of a family in the same generation and is more frequent in the male sex. Of the eighty cases collected by Hoffmann, five had hereditary unilateral or bilateral cataract and three sporadic cataract, altogether 10 per cent. of the cases. To Hoffmann's knowledge, cataract has not been observed in true myotonia congenita without atrophy.

*Eight cases of myopathy* are reported by Thomas J. Orbison,[3] who states in his summary that one of the patients was a negro and that he knows of no other case in a colored person. In this case there has been an arrest of the condition for over a year. The electrical reactions in every case showed a very much delayed faradic response on the part of the affected muscles. Two of the patients were brothers, but in no other case was the familial element present. In none of them was there a history of heredity. The administration of electricity was distinctly beneficial in at least one case. No definite etiologic factor could be elicited in these cases, except possible muscle strain in one case and "general exposure" in another case.

**A Case of Muscular Dystrophy in a Negro.** This case is reported from Brazil by A. Austregésilo,[4] professor in the medical school at Rio de Janeiro, who states that he is not aware of any previous case in a negro being on record.

[Above is mentioned a later report of a similar case by Thos. Orbison.—Ed.] The patient, a boy 12 years old, presents a typical picture of the pseudo-hypertrophic form.

**The Pathogenesis of Myasthenia Gravis.** For many years efforts have been made to connect this obscure affection with the ductless glands, especially with the parathyroids. A new case with ductless gland complications is reported by Erich Stern.[5] A woman, 31 years

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(3) Amer. Jour. Med Sci., October, 1914, p. 550.
(4) Nouv. Iconog. de la Saltp trière, 1913, Vol. 26, p. 430.
(5) Neurolog. Centralbl., April 1, 1914.

old, with typical exophthalmic goiter developed complete paralysis of the external ocular muscles, and within a few months there appeared disturbances of speech and swallowing and weakness of the skeletal muscles, with the pronounced exhaustibility characteristic of true myasthenia. The characteristic myasthenic electric reaction was present. Later, Chvostek's sign (increased mechanical irritability of the motor nerves) and other symptoms of tetany, such as spasms in the fingers, as well as bronzing of the skin, like that of Addison's disease, were observed. This patient therefore presented, in addition to typical exophthalmic goiter and typical myasthenia gravis, some symptoms suggestive of parathyroid and adrenal involvement. Of nine cases of myasthenia, including the present one, observed in Mendel's polyclinic in Berlin, not less than four had also exophthalmic goiter. This indicates something more than a mere coincidence, and Oppenheim has previously expressed the opinion that exophthalmic goiter produces a predisposition to myasthenia or that the diseases have a common origin. As a matter of fact, several phenomena are frequently observed in both diseases. Thus, persistent thymus, so common in myasthenia, according to some statistics occurs in 75 per cent. of cases of exophthalmic goiter. Salmon found the myasthenic reaction in some cases of exophthalmic goiter. An increased consumption of oxygen and nitrogen has been demonstrated in both diseases. In the present case, the author proposes to perform partial thyroidectomy and thymectomy. He is inclined to believe that of the ductless glands the thymus plays the principal rôle in myasthenia.

**Paralysis Agitans Syndrome With Syphilis of the Nervous System.** The etiology of typical Parkinson's disease remains obscure, and it has not even been settled whether the characteristic tremor and muscular rigidity are caused by changes in the nervous system or merely by muscular changes. However, it has been demonstrated that occasionally this symptom complex may exist in cases of disease of the brain, particularly of the basal ganglia. It is therefore necessary when a patient, apparently afflicted with the typical disease, comes to us, to make a complete examination, as we otherwise occasionally would be led astray. A combination of paralysis agitans and tabes has been so frequently reported that Carl D. Camp[6] recently has made a special study of the subject in a paper read before the American Neurological Association in May, 1914. Camp satisfied himself that ordinary paralysis agitans is not caused by syphilis, but that a typical Parkinson's syndrome may coëxist with and be caused by a syphilitic lesion in the central nervous system and that such lesion is probably irritative rather than destructive. He examined the spinal fluid in ten typical cases and found it normal. In order also to make a therapeutic test, he gave intravenous injections of neosalvarsan to six of these patients. One patient, 45 years old, with paralysis agitans of two years' standing, claimed that the tremor was lessened, that his appetite was better and that he had less stiffness; objectively, there was a slight lessening of the rigidity, but the characteristic tremor persisted. In two other cases there was an improvement subjectively, but no objective change. One patient developed severe nausea and vomiting after the second injection and refused further treatment. In two, the treatment had no effect whatever. It seems that Heinmann in 1888 was the first to report a case of tabes and paralysis agitans in the same patient. Placzek reported a second case, in 1892, in a man 52 years old, who first complained of lancinating pains and three years later developed a typical paralysis agitans tremor. Many similar cases have been reported in Europe, and in 1902 Rhein of Philadelphia reported a case of tabes in which there was a tremor resembling that of paralysis agitans, while the other symptoms of that disease were missing. Camp states that it seems likely that some of these cases have been cases of tabes dorsalis or cerebrospinal syphilis, in which there occurred as a symptom a tremor like that of paralysis agitans. Excluding such cases, there still remain a number in which there is apparently a complete clinical picture of that disease. They are usually explained as due to a simple coincidence, but Camp does not find such an explanation entirely satisfactory and is inclined to consider the syphilitic virus as the essential cause of all the symptoms presented.

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(6) Jour. Nerv. and Ment. Dis., 1914, Vol. 49, p. 489.

Camp reports in detail the case of a woman, 53 years old, complaining chiefly of difficulty in walking and in the use of her right hand, in which there was a constant rhythmic tremor. The tremor had existed for two years and the left hand had become slightly involved. About six months after the onset of the tremor she began having "jabbing" pains in the legs and also complained of numbness and weakness in the legs and paresthesias in various parts of the body. The pupils did not react to light. The head showed a lateral oscillatory tremor at least in part transmitted from the arm. The right arm was more rigid to passive motion than the left, and in walking the right leg was held more stiffly than the left, and there was some tendency to propulsion. The Romberg sign was present: the knee reflexes were normal but the ankle reflexes were absent. There was some delay to sensation to pin points in the lower extremities and the sense of motion and position of the toes was lost on both sides. The Wassermann test was positive, both with blood and with spinal fluid, and the latter gave a positive globulin test and showed marked lymphocytosis (130 cells per cubic mm.). She was given three intravenous injections of neosalvarsan. with the result that the tremor almost disappeared, the rigidity was diminished so she could walk much better and there was improvement in the sensation in the feet. She returned three months later and said that she felt practically well, but the Argyll-Robertson pupil and the other signs of tabes were about as before, as were the laboratory tests. Her facial expression was mask-like, and there was slight rigidity in the right arm, but no tremor. Three months later she was again examined, with practically the same findings.

**Age and Paralysis Agitans.** Paralysis agitans is a common disease and almost every physician has a definite mental picture of the appearance of the patient and usually recognizes the disease at a distance. When we stop to analyze this mental picture we will all agree that the subject is an elderly person. In fact, the disease is decidedly one of man's declining years and it is therefore not so strange as it might at first appear that a leading medical journal of Vienna should give space to a report of a case in a man 38 years old. The case is reported by Georg Stiefler,[7] who has sifted the literature to elucidate the question of the age at the onset. K. Mendel gives the average age at the onset as 56 years and Willige, in the entire literature from 1850 to 1910, finds only fourteen certain cases with onset before the age of 30. Later, König, among twenty-three patients, found only one with the onset as early as at the age of 34 years, and Oppenheim[8] reports one case with onset at 33 years, and mentions another case with onset at 27 years. He, however, strongly emphasizes the rarity of these so-called juvenile cases.

## PELLAGRA.

**The Work of the Thompson-McFadden Pellagra Commission.** This commission consists of workers selected by the New York Postgraduate Medical School, who have been at work in Spartanburg County, S. C., since the summer of 1912. Two reports have been submitted so far, presented by J. F. Siler of the U. S. Army, P. E. Garrison of the U. S. Navy and W. G. MacNeal of the New York Postgraduate Medical School. A summary of the first report[9] is as follows:

1. The supposition that the ingestion of good or spoiled maize is the essential cause of pellagra is not supported by our study.
2. Pellagra is in all probability a specific infectious disease communicable from person to person by means at present unknown.
3. We have discovered no evidence incriminating flies of the genus *Simulium* in the causation of pellagra, except their universal distribution throughout the area studied. If it is distributed by a blood-sucking insect, *Stomoxys calcitrans* would appear to be the most probable carrier.
4. We are inclined to regard intimate association in the household and the contamination of food with the excretions of pellagrins as possible modes of distribution of the disease.
5. No specific cause of pellagra has been recognized.

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(7) Wien. klin. Wochenschr., March 12, 1914.
(8) Neurol. Centralbl., 1913, p. 466.
(9) Jour. Amer. Med. Ass'n., January 3, 1914.

The second report,[1] which was presented at the 1914 meeting of the American Medical Association, is summarized as follows:

1. The large active foci of pellagra in Spartanburg County were found in and near the large centers of population, and particularly in the cotton-mill villages.
2. Children under the age of 2, adolescents for about five years following puberty, and adult males in the active period of life were least frequently affected by pellagra. On the other hand, women from 20 to 44 years of age, old persons of both sexes and children from 2 to ten years of age were most frequently affected.
3. No definite connection between occupation and the occurrence of pellagra has been found, although the high pellagra morbidity in the women and children points to the home as the place in which the disease is usually contracted.
4. In the group of incident cases most thoroughly studied, evidence of close association with a pre-existing case was disclosed in more than 80 per cent.
5. A house-to-house canvass of the homes of over 5,000 people living in six endemic foci of pellagra failed to disclose any definite relation of the disease to any element of the dietary.
6. In these six villages new cases of pellagra originated almost exclusively in a house in which a pre-existing pellagrin was living, or next door to such a house, suggesting that the disease has spread from old cases as centers.
7. So far as we have observed, pellagra has spread most rapidly in districts where insanitary methods of sewage disposal have been in use.
8. Additional evidence has been obtained to support the conclusion that flies of the genus *Simulium* have nothing to do with pellagra.
9. Animal inoculations and the experimental study of intestinal bacteria have not yielded conclusive results.
10. The studies of the blood have shown a lymphocytosis in most cases, but have not disclosed any constant abnormality characteristic of pellagra.
11. There is no evidence of inheritance of pellagra.

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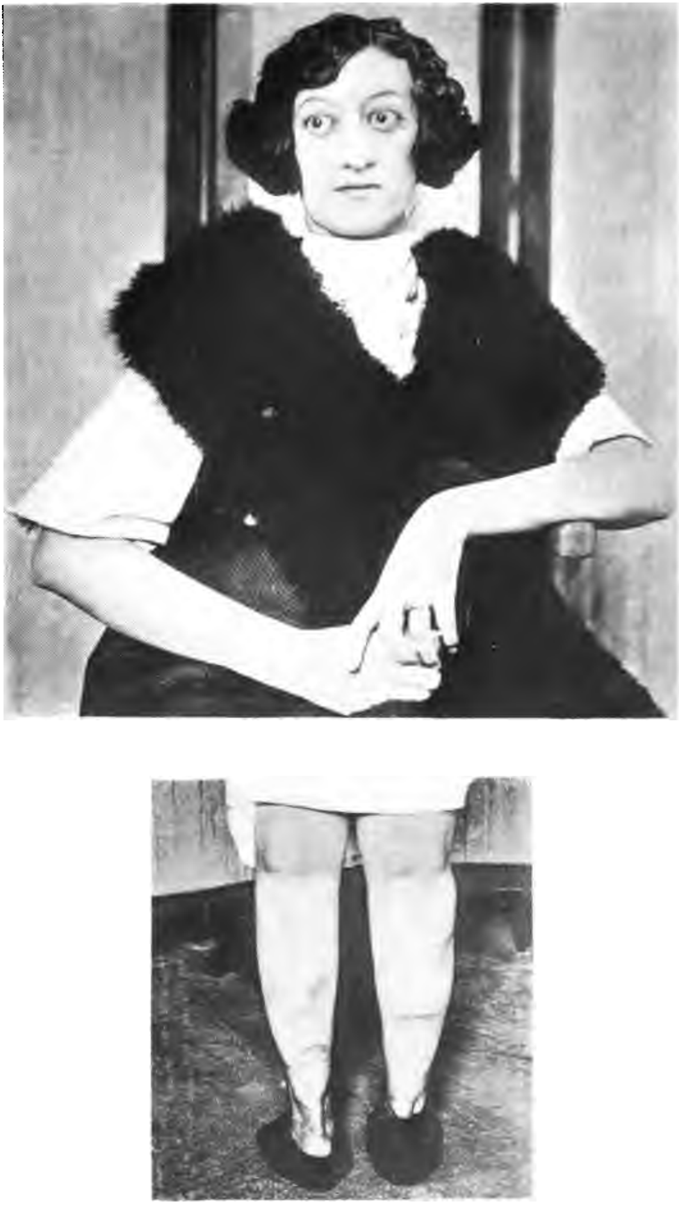
(1) Jour. Amer. Med. Ass'n., September 26, 1914.

PLATE VII.



Exophthalmic goiter and scleroderma.—Marinesco and Goldstein.
(Page 147.)

12. The immediate results of hygienic and dietetic treatment in adults have been good, but after returning to former conditions of environment, most of the cases have recurred. In children, prognosis is very much more favorable.

**Treatment of Pellagra.** This is taken up by Carl Voegtlin,[2] professor of pharmacology in the U. S. Public Health Service, who states that owing to the lack of knowledge regarding the etiology of the disease the treatment is restricted to symptomatic and empirical procedures in which diet and rest figure most prominently. The author is in favor of the hypothesis that the disease depends on a chronic intoxication, and is inclined to believe that the toxic substances are derived from certain vegetable foods. He has carried on feeding experiments with animals, such as mice, rats and monkeys, and found that when these animals were put on an exclusive diet of corn, carrots, sweet potatoes, oats, etc., they developed certain gastro-intestinal symptoms and sometimes died. Investigation of the toxic substances involved revealed the fact that relatively large amounts of soluble aluminum compounds were present in these vegetable products. The author advises further study of the possible toxic effects of aluminum and refers to some very recent work reported from Italy by Allesandrini and Scala,[3] who claim that colloidal silica contained in drinking water is one of the most important etiologic factors, as they succeeded in producing lesions resembling pellagra in animals given water containing colloidal silica. Colloidal aluminum hydroxide or a mixture of colloidal silica and alumina produced the same results. Voegtlin makes a plea for a liberal and varied diet in pellagra.

"By substituting for part of the vegetable food, animal foodstuffs, such as meat, eggs, etc., the absolute amount of vegetable products consumed will be reduced considerably. Hence we probably also reduce the possibility of an injurious action of the vegetable food on the body, particularly the irritant action on the gastro-intestinal canal. Meat is known to be easily digested by pellagrins,

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(2) Jour. Amer. Med. Ass'n., Sept. 26, 1914.

(3) Contributo Nuovo alla Etiologie e Pathogenesi della pellagra, Rome, 1914.

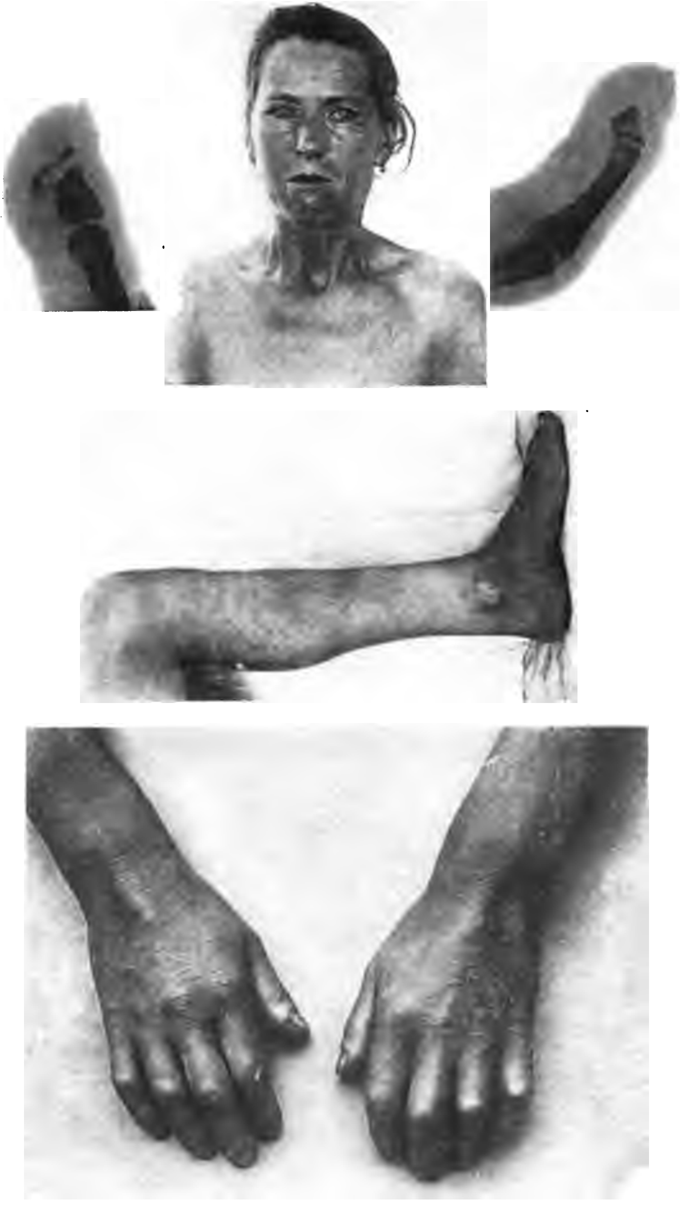
leaving practically no unassimilated residue in the intestine. Meat, furthermore, satisfies the appetite in much smaller quantities than does the voluminous vegetable diet with its relatively large amount of undigested cellulose.

"Quite recently another field in nutrition was opened up through the discovery of the presence of small quantities of new substances occurring in foods which seem to be essential for the maintenance of health. These substances are termed vitamins by Funk. They occur in animal as well as vegetable food in varying amounts. Certain foodstuffs, as polished rice, are extremely poor in vitamins; others, as meats, are relatively rich in these substances. The hypothesis has been advanced by Funk that pellagra is a disease due to the lack of some vitamin in food, analogous to the production of beriberi through the more or less exclusive consumption of polished rice. So far no experimental or clinical proofs have been advanced to support this hypothesis.

"Summing up these remarks, we see that our modern conceptions of nutrition and metabolism throw some light on the beneficial effect of a liberal mixed diet on the course of pellagra."

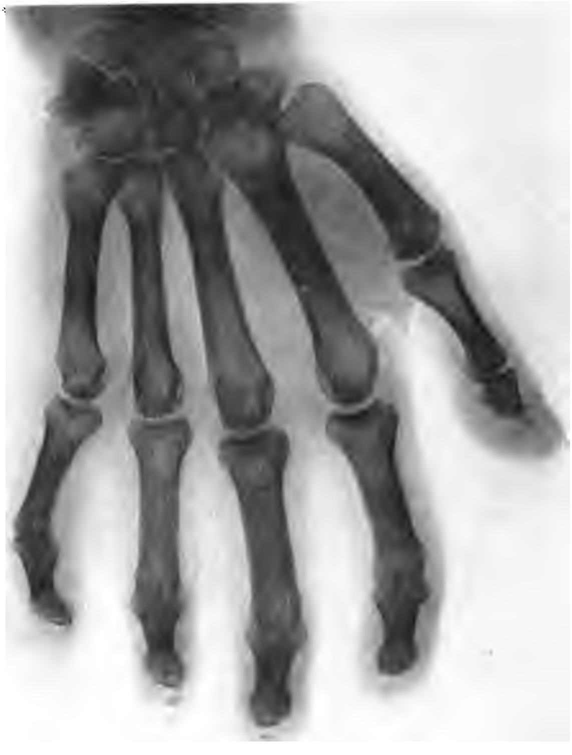
"It is probably more than a mere coincidence that the population of that part of the world in which pellagra is endemic lives on a mainly vegetable diet. Economic conditions seem to influence in a general way the diet of people. A vegetable diet is as a rule less expensive, and persons in poor circumstances limit the consumption of the costly meats and other animal food to a minimum. In this connection I should like to call attention to the fact that pellagra appeared in France soon after the reign of the first Napoleon, a period which was followed by extreme poverty in the country. France recovered from this economic depression in the latter part of the nineteenth century. With this change in economic conditions, partly brought about through the introduction of the more profitable wine industry, pellagra decreased to such an extent that the disease is now very rare in that country. It is impossible to say at present that the food as such is the only factor in the production of pellagra, but even some of the adherents of the infectious

## PLATE VIII.



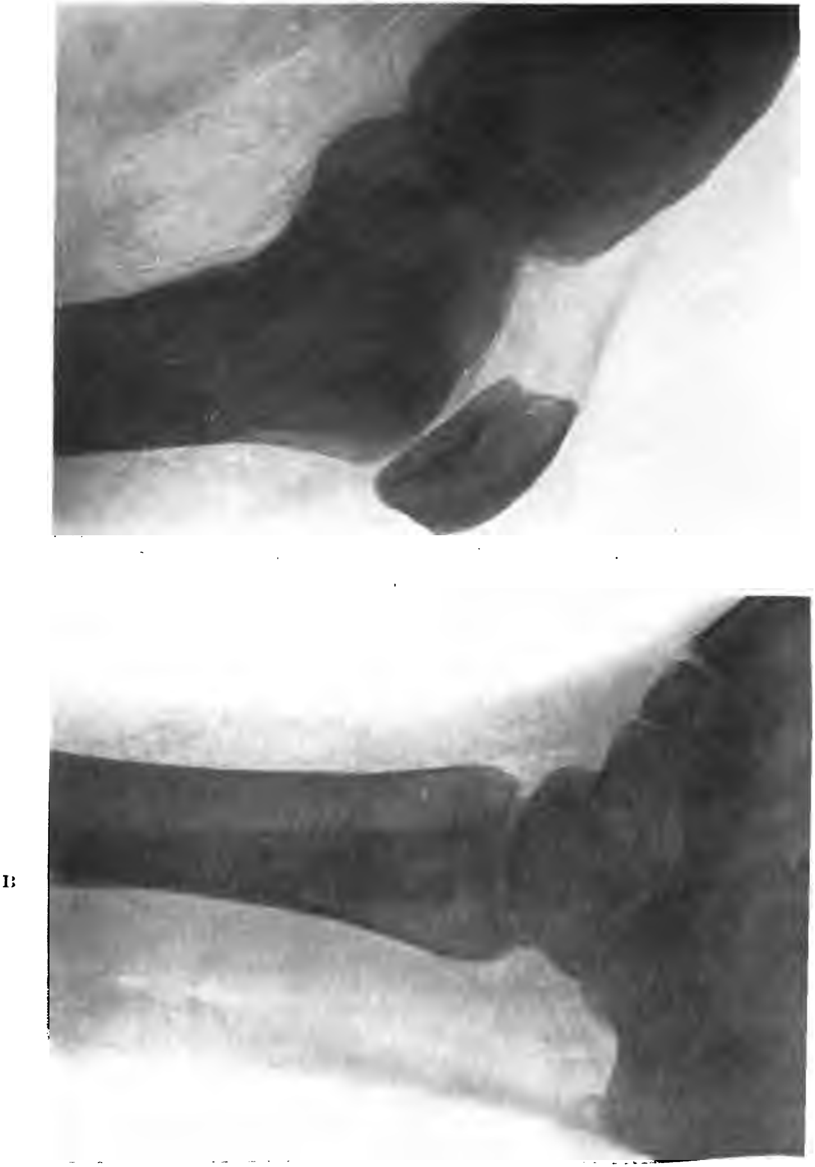
Scleroderma.—Bertolotti. (Page 147.)

PLATE IX.



Destruction of terminal phalanges in scleroderma.—Bertolotti.
(Page 147.)

# PLATE X.



Scleroderma. A. Calcification of patellar tendon. B. Same of tendo achilles.—Bertolotti. (Page 147.)

theory do not deny that the one-sided diet may be one of the contributing factors in the production of this disease.

"The recent advances in the field of nutrition suggest new avenues of approach to the solution of this difficult problem. One will have to consider very seriously:

"1. A deficiency or absence of certain vitamins in the diet.

"2. The toxic effect of some substances, as aluminum, which occur in certain vegetable food.

"3. A deficiency of the diet in certain amino-acids."

**Co-existence of Exophthalmic Goiter and Scleroderma** in a woman 20 years old is reported by Marinesco and Goldstein.[4] Symptoms of exophthalmic goiter appeared at the age of 15 years and those of scleroderma at about 18 years. When observed at the age of 20, in addition to the typical signs of exophthalmic goiter, she presented about a dozen fairly symmetrical patches of scleroderma, two of which were situated on the outer and anterior portion of the legs, and all the others on the posterior part of the legs. (Plate VII.)

The association of hyperthyroidism and scleroderma has occasionally been described by other authors and is relatively much more frequent than the association of scleroderma and myxedema, which is extremely rare. As to the obscure problem of the etiology of scleroderma, the authors believe that no one theory is applicable to all cases, but that the most frequent cause is disturbance of the thyroid gland, the modified secretions of which produce the changes in the skin by affecting the sympathetic.

The *x*-ray findings in scleroderma are illustrated and discussed at length by M. Bertolotti,[5] who also reports a case with the appearance illustrated in Plate VIII. The patient, a woman, 36 years old, had presented some signs of diminished thyroid activity for six years and showed evidence of scleroderma of all four extremities. Local asphyxia of the fingers and toes with trophic disturbances such as those seen in Raynaud's disease were present, and in places the muscles were atrophic and

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(4) Nouv. iconog. de la Saltpêtrière, 1913, Vol. 26, p. 272.
(5) Nouv. iconog. de la Saltpêtrière, 1913, Vol. 26, p. 291.

indurated and their tendons retracted, indurated and calcified. Furthermore, in places the skin contained calcareous deposits and the *x*-ray examination indicates enlargement of the hypophysis as the sella turcica was found to be enlarged. The *x*-ray examination also showed bone destruction in the terminal phalanges and ankylosis of the phalangeal joints. The calcification and other sclerotic changes in the patellar and Achilles tendons also were shown. (Plates IX and X.)

**Oxycephaly and the Oxycephalic Syndrome.** According to René Charon and Paul Courbon,[6] the term oxycephaly embraces all cranial deformities with an abnormal height of the vault of the skull. This includes the so-called acrocephaly, scaphocephaly and the "tower skull" (Turmschädel). Common to all of these forms is a premature ossification of all or part of the cranium. These deformities are not always congenital, but may develop in childhood and possibly even in adult life. The results of the deformity sometimes produce a combination of symptoms designated the oxycephalic syndrome, consisting of exophthalmos, optic nerve atrophy and mental weakness. The occurrence of the optic neuritis or of optic atrophy has been amply corroborated by a great many ophthalmologists. Mental symptoms are often wanting, in fact, some famous men of superior intellect were more or less oxycephalic, such as Paracelsus, Walter Scott and Meckel. The authors report two cases.

Case 1 (Plate XI, A). This patient is now 12 years old and imbecile. As will be seen in the photographs, there is some exophthalmos without strabismus, but the optic nerves are normal. *X*-ray examination shows a lowering of the sella turcica so that the middle cerebral fossa, instead of being on a higher level than the posterior fossa, is at about the same level. The occipital and parietal bones show numerous digital impressions. These findings are said by Bertolotti to be pathognomonic of oxycephaly.

Case 2 is that of a man 70 years old (Plate XI, B), who has been an inmate of an idiot asylum since the age of 14 years. There are no eye findings.

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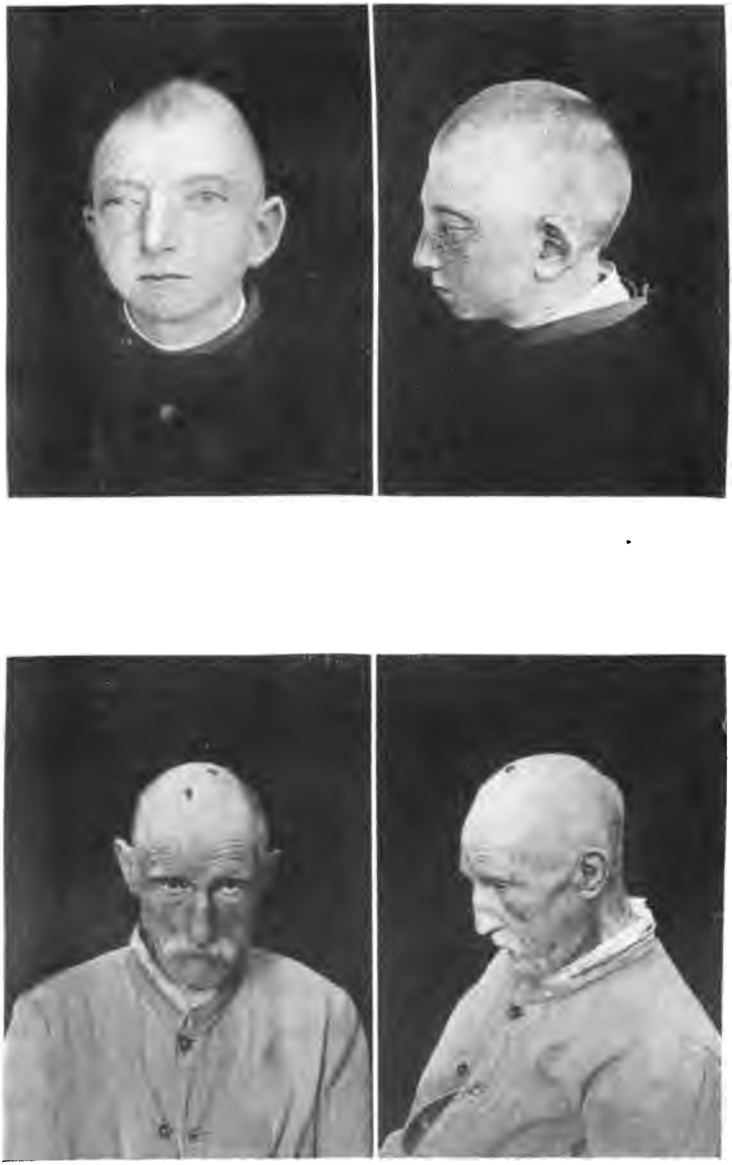
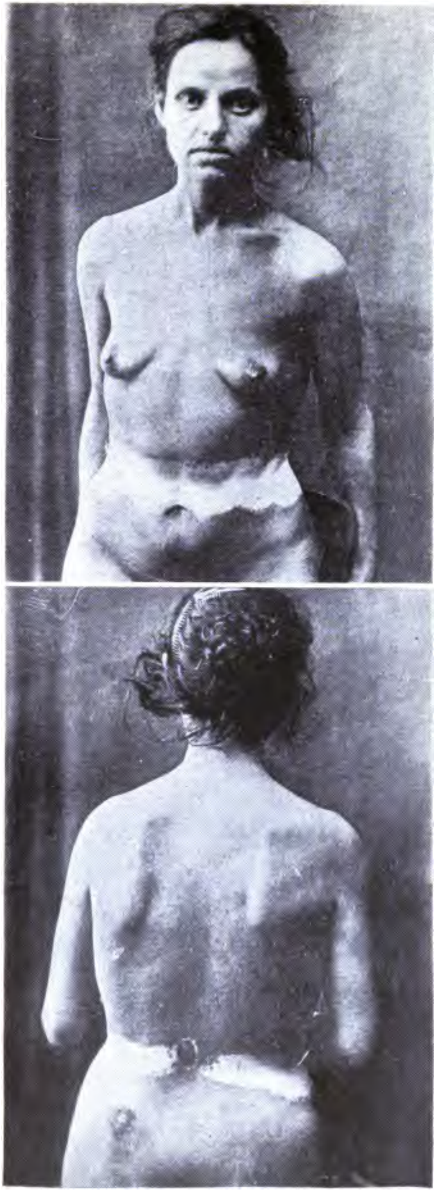
(6) Nouv. iconog. de la Saltpêtrière, 1913, Vol. 26, page 422.

## PLATE XI.



Oxycephaly.—Charon and Courbon. (Page 148.)

PLATE XII.



Belt-like vitiligo.—Bacaloglu and Parhon. (Page 149.)

**"Acrocephalo-Syndactylism."** This is the name given to a rare combination of congenital malformations chief among which is a type of deformity of the skull which must belong in the general class of oxycephaly and is characterized by a very high and vertical forehead and a smooth and almost vertical occiput with absence of occipital protuberance. Furthermore, a deformed palate and exophthalmos are usually present. The hands and feet show more or less complete syndactylism, which always is of the same type. The fingers show more intimate union at their tips than at the bases and the nails of the three middle fingers are usually fused. The toes are usually fused completely and have a single nail. Recently W. Sterling,[7] in a general review of malformations of the osseous system, has gathered together the ten cases hitherto reported. The condition was first described by Apert[8] and called "acrosphenodactylie."

[A few weeks ago I discovered a typical case of this kind in the children's ward of a Chicago hospital. The patient is a girl, 3 years old, of apparently fairly good mentality, with the typical head, exophthalmos, deeply grooved palate and webbed fingers and toes. Five unsuccessful operations have been performed to separate the fingers.—P. B.]

**Belt-like Vitiligo in a Syphilitic Subject.** C. Bacaloglu and C. I. Parhon[9] describe a peculiar condition of the skin (Plate XII) in a woman 27 years old. There is a zone from 3 to 8 cm. broad surrounding the entire body at the level of the umbilicus in which the skin is devoid of pigment and shows a diminished tactile, pain and temperature sense. Posteriorly, over the third lumbar vertebra, there is an oval, intensely brown thickening of the skin which, according to the patient, desquamates in the summer. On the chest and back a few other achromic areas of skin, of small size, are seen. The interesting feature is the belt-like, "metameric" distribution of the achromic area which suggests that the cutaneous condition bears some relation to the corresponding

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(7) Zeitschr. f. d. gesamte Neurol. u. Psychiatr., 1914, Vol. 9, (Referate), p. 138.

(8) Soc. méd. des hôp. de Paris, 1905.

(9) Nouv. iconog. de la Saltpêtrière, 1913, Vol. 26, p. 309.

segments of the spinal cord. So far as could be learned, the condition of the skin of this patient is congenital.

[If so, the term vitiligo should not be used, as, according to Hyde and Montgomery's text book, vitiligo is an "acquired, cutaneous achromia, exhibited in single or multiple, variously sized and shaped patches, unaccompanied by textural changes in the skin and usually bordered by tissues exhibiting pigmentary excess." The term leukoderma is used in this text book to designate pigment atrophy, which is partial and congenital, albinism that which is universal and congenital, and vitiligo that which is acquired.—Ed.]

The patient showed many signs of syphilis and gave a positive Wassermann reaction with the blood, but all of the spinal fluid tests were negative. The tibias were curved and thickened, and this, with the low stature of the patient, 4 ft. 6 in., may indicate that the syphilis was congenital and possibly responsible for some lesion in the nervous system and possibly in the ductless glands, one of which, or both, may have determined the disorder of the skin. Marie and Crouzon have reported a case of extensive vitiligo developing in the course of twenty years in a syphilitic subject, and others have reported similar cases, but that syphilis is not the only cause is demonstrated by Renault's observation of a patient affected with vitiligo who subsequently contracted syphilis. Several cases of vitiligo in tabetics have also been reported. But, on the other hand, vitiligo has been associated with non-syphilitic organic nervous diseases and with exophthalmic goiter and myxedema.

# MENTAL DISEASES.

## GENERAL CONSIDERATIONS.

**The Teaching of Psychiatry in American Medical Schools.** Ross Moore[1] sent out the following questions to seventy of the Class A+, Class A and Class B medical schools:

1. How many hours are given to the teaching of psychiatry in your school?
2. How many hours would you like to have for it?
3. Does your course correlate psychology with psychiatry in a definite manner?
4. What faults have you noted in present teaching methods?
5. Outline your ideal course in psychiatry.

About forty replies were received and, on the whole, they showed that the majority of the men teaching this subject are entirely dissatisfied with the situation. A calculation based on all the answers to question 1 shows that American medical schools average 33.4 hours of combined clinical and didactic work in psychiatry, leaving out two schools one of which gives 140 and the other 69 hours to the subject the average is but 28.6 hours. The replies to question 2 show that the average number of hours desired is 50.3.

In summing up the subject, Moore states that American teachers of psychiatry demand an increase of from 33 to 50 per cent. in time alloted to this subject by curriculum committees. The subject is so irregularly taught that while one Class A+ school is found to be giving 179 hours to it, another is found to schedule no hours at all. The chief fault with the present course is

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(1) Jour. Amer. Med. Ass'n., November 7, 1914.

the almost universal lack of a psychiatric clinic where other than asylum cases can be studied.

**The Ideal Course in Psychiatry for Medical Schools,** according to H. Douglas Singer,[2] director of the Illinois State Psychopathic Institute, may be summarized briefly as follows:

1. Nerve physiology with especial consideration of the integrative actions as taught by Sherrington.
2. Dynamic physiology or a study of the modes of reaction accomplished through the cerebral association system.
3. Study of individual reaction types with especial emphasis on their importance in the prevention of insanity. Under this heading would come the Binet-Simon tests of intelligence.
4. Disorders of attitude resulting from disease or inadequacy of the effector organs of the body.
5. The effects of changes in the nervous system produced by intoxication and malnutrition.
6. The effects of gross structural alterations in the nervous system.

Singer points out that while the treatment of mental disorders is almost entirely carried out in special institutions and hence enters but little into the province of the general practitioner, the original recognition of the need for such treatment must be his duty. To fulfil this he must be able to recognize evidences of mental disorder before they become obvious to the ordinary layman. If he is to carry out the higher ideals of prevention he must furthermore know something of etiology and be able to grasp and to heed the warning signals before the outbreak of the disorder.

The one feature which characterizes man as the highest type of living organism is his adaptability. This adaption is rendered possible by the complexity of his nervous system through which the various effector organs are regulated and rendered more flexible. It then necessarily follows that in order reasonably to understand and rationally to treat disorders and disease of the body generally it is absolutely essential that the physician have some knowledge of these coördinating mechanisms. With

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(2) Jour. Amer. Med. Ass'n., November 7, 1914.

this broad basis in view, the teaching of psychiatry, according to this author, is not of special but of fundamental and general interest and the particular directions in which it should be pushed are those which throw light on (1) the highest cerebral mechanisms and the adjustments they subserve, that is, psychology, and (2) the etiology of disorders in this sphere.

After pointing out the errors of the older psychology, emphasizing the contrast between mind and body and the too-rigid stress laid on systems of classification in teaching, the author points out that the mental picture is not the disease but only a symptom of the disease or inadequacy in construction, not only of the brain but of the various organs of the body.

"All psychoses present certain peculiarities of thought and conduct and the problem to be solved is the determination of the manner in which this person reaches the conclusions which these peculiarities represent. In order to start out on this question it is obviously first of all necessary to have some knowledge of the rules governing the operation of these mechanisms. In other words, it is necessary to study physiology and especially the physiology of the associative mechanisms of the brain, which is nothing more nor less than psychology—not the older psychology, which has been condemned above, but the more modern aspect, which considers these nerve activities as a means of adaptation. It is not a question of studying the conscious state, as such, but of observing the manner of meeting existing situations rendered possible by the conscious mechanisms available.

"The best introduction to this study with which I am familiar is 'The Integrative Action of the Nervous System,' by Sherrington. Here is shown in the most lucid and instructive manner the meaning of adaptation and of the selection of an appropriate response to a given stimulus, all entirely apart from any question of conscious choosing. The reactions which occur are highly complex, but at the same time accurately arranged for the accomplishment of a definite purpose, this being the conversion of the stimulus to the welfare of the organism. There are illustrated combined activities of the whole musculature of the body into a picture apparently expressing emotion, although no conscious feeling can possibly be present. The laws governing the selection of reactions are admirably elucidated and can be applied equally well to the solution of this same question where conscious mechanisms are in operation.

"From this as a starting point it becomes easy to grasp the real relation between the conscious feelings called moods, affects and attentive interest on the one hand, and the condition of the body as a whole on the other. It is not a question of reacting to situations in a certain manner because we feel this way or that, but simply that the condition of activity or rest of the muscular and glandular organs of the body, together with the conscious feeling, is the mode of meeting the situation adopted. The adoption of this particular attitude is the outcome of many factors, the consideration of which will give us the key to a rational method of teaching this subject. The person popularly described as insane, the hysteric, the psychasthenic and the man with nervous dyspepsia have all adopted a certain attitude toward the situation in which they are placed. This may be described as unusual or abnormal but not necessarily as diseased and certainly *not* as a disease of any hypothetic mind. The conduct and behavior, the delusions and often the sense falsifications thus cease to be 'symptoms' of any special disease process but take their true position as part of a particular mode of meeting some situation. This is the situation as it appears to the patient and not necessarily that which the onlooker perceives.

"The factors which must be considered in teaching concern not only the condition of the nervous system but also that of the whole body. It must be obvious from what has already been said that disturbance of the general attitude, including the feelings or moods, is inseparable from a lack of harmonious coöperation among the parts of the body. Such disturbances (symptomatic depressions, etc.), result, as we well know, from disease of all organs, and these facts need illustration and analysis in any course of study. From them can well be deduced the further fact that, even without disease, organs may be so poorly constructed that they fail to perform their function adequately whenever any special call is made on them, with consequent general disharmony and concomitant affective disturbance."

**Medico-Psychological Work in Courts.** William Healy,[3] director of the Psychopathic Institute of the Juvenile Court of Chicago, has for the last five years carried on investigations on juvenile delinquents which, justly, have attracted country-wide attention. As a result, a system of excellent coöperation on the part of judges, physicians, charitable organizations and the general public is in full working order.

"With development of these better understandings many remedial agencies have been set at work. In the Detention Home the wards of the court profit by the daily attentions of a physician, a dentist, a corps of teachers, an instructor in physical training and resident nurses. The court sends to the best specialists all cases of defective vision and the many other ailments which need attention. It obtains country life for many of those who need it. It runs a definite employment agency which endeavors to place the individual at work for which he is specially fitted. It aims to place in proper institutions those who are afflicted. Above all, it endeavors to coöperate with relatives and awaken them to the needs of their own kin. So it has come about that in the sessions of this court one may hear considered the correlations between defective vision and failure in school or in employment, which, of course, lead directly to delinquency. One may hear discussed the relationship of epilepsy to moral unreliability, of the effects of various debilitating habits in producing mental instability or lethargy, or the connection between mental defect and criminality. All these, and many other things, should be considered by officers of a court, as well as the more obvious effects of bad companionship, lack of parental control and other weaknesses in environmental conditions.

"The actual basis of psychologic work in connection with offenders lies in the fundamental fact that conduct is the direct result of mental life. Misconduct may sometimes imply aberrational mental life or primary mental defect, but there are a thousand and one influ-

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(3) Illinois Med. Jour., October, 1914, p. 359.

ences, environmental or directly physical, which may give the impulse toward delinquency.

"There has been a tendency all along in the history of criminology to promulgate some given theory in explanation of crime in general. Often such a dictum has been based on special observations made in this or that country and under this or that special situation. The result has been astounding statements concerning the relationship of various physical and mental conditions to crime. The medico-psychologist in court work who pursues the method of the psychiatrist and studies the cases by longitudinal as well as cross-section methods, comes to see the vast intricacies of causation. No part of it is simple. It practically always requires the effect of environmental influences to create a criminal out of even a mental defective. Those who will undertake studies of the offenders in the open, as Devon says all offenders should be studied, and get the background of their family circumstances and their developmental history, their heredity, their early habits and so on, will come to realize, as we have realized in our years of careful investigation, that:

"1. Thorough study of criminals which includes their mental traits is altogether a new-born science. Time shows that large general statements usually have to be greatly modified in this as in other fields newly opened to research.

"2. The complexities of the human mind are so great that predictions are not safely made on the basis of half-hour studies of the individual. One comes to know many cases which demonstrate the unreliability of prognoses made according to large categorical valuations.

"3. Short cross-section studies, then, are not enough in the vast majority of cases to answer the problems which the courts need answered.

"4. A significant class of delinquents is the mental defectives, but even among them are great individual differences in regard to capabilities. Those who grade on the same age level according to the newer methods of measurement may be adaptable to widely varying conditions. A larger variety of tests will bring out these differences. After one has witnessed such cases as that of a feeble-minded burglar, a fellow with a long record and with great manual dexterity, succeed as an honest man in country life where he could use his special talents, one becomes less sure about many dicta.

"5. Because a great share of those who are caught are mental defectives is no sign that anything like the majority of crimes are committed by the feeble-minded. The bright offender, we find, may have fifty crimes to his record before he is captured, where the moron, on account of his lesser astuteness, is easily recognized and apprehended after perhaps a single offense.

"6. If the causative factors are fair-mindedly studied out, one finds vast sources of the trouble in parental life, or in other surrounding conditions. For instance, of 1,000 cases of young repeated offenders carefully studied, 31 per cent. were found to have at least one parent more than a moderate user of intoxicating drinks. Immorality, quarreling, poverty, broken-up families in 67 per cent. of the cases were factors. The lack of healthy mental interests was an astonishingly large source of trouble, as was also bad companionship.

"7. In these 1,000 cases, 7 per cent. were epileptic, and in 53 other cases, where the offender was not epileptic, another member of the immediate family was subject to convulsions; 7 per cent. had some form of psychosis. About 15 per cent. were feeble-minded. About 65 per cent., however, had nothing discernible the matter as mental defect or aberration.

"8. Physical conditions causing irritations and disabilities which tended toward delinquency by influencing the mind in this or that direction were contributing factors in at least one-third of the cases. Sensory defects occupied an important place in this group. Premature development, among girls especially, is a direct source of moral break-down.

"9. The factors in the individual case are most frequently not at all brought out in courts where adults are tried. The disposition of the individual is most often made without any deep consideration of the needs of the offender or of society.

"10. Coöperation between courts and other public institutions is astonishingly small. What was known of the individual in other cities, or in a given institution, or even in another court in the same city, is rarely brought forward in the case. Indeed, in most courts there is no attempt to make or preserve a record of the case in any such way as might lead to better understanding of him in the future.

"11. The difficulties of ascertaining the efficiency of this or that given type of procedure under the law are, through all the above circumstances, very great without the introduction of some scientific method. It is time that such was begun by courts everywhere.

"The medico-psychologist must take the ground of studying the whole individual and the causative factors of his career. Here is John Doe under arrest. One must find that he has (1) such-and-such physical characteristics, including both his special abilities as well as disabilities, and (2) such-and-such mental qualifications, disabilities, aberrational tendencies and general traits; (3) he has committed such-and-such types of delinquent acts; (4) in the background there are such-and-such conditions of heredity, physical development, traumatism, early teachings of immoral conduct, bad personal habits, lack of educational opportunities, and so on; (5) then in the light of the offender's being what he is physically and mentally, and having this given background, on the basis of easily knowable predictabilities something like a justifiable prognosis can be offered if such and such treatment is afforded under whatever environment may be available.

"Such are the possibilities of medico-psychologic work in courts. The whole study is to be directly aimed at predictabilities, just such as the court should wish to know, and conclusion can not fairly be reached without knowledge of a great many of the various capabilities of the offender and of whence arose the tendency to delinquency.

"If judgments of courts are to be ruled by reason, then the science which explains tendencies and actions will play a large part in rendering more efficient the whole legal and penal procedure."

**A Guide to the Descriptive Study of the Personality with Special Reference to the Taking of Anamneses of**

**Cases with Psychoses.** This is the title of a paper by August Hoch and George S. Amsden.[4] For several years August Hoch, the able director of the Psychiatric Institute of the New York State Hospitals, has been occupied with important investigations of the mental make-up of persons who develop mental disease. Thus his admirable description of the so-called shut-in personality often met in people who develop dementia præcox was referred to at some length in the Practical Medicine Series, 1910, vol. 10, p. 224. The purpose of the present communication will be gleaned from the following paragraphs:

"For some years we have been interested in the study of the relation between personality and the psychoses. From the first of it the inadequate general statements concerning the personal constitution before the definite mental breakdown, set down even in very good anamneses, emphasized to us the need of some uniform way of collecting the data. The following guide represents our endeavor to meet this need. It is the result of many revisions and modifications suggested by the actual work. Our endeavor, then, started from the practical demand, in cases which come to the notice of the psychiatrist, for adequate anamneses referring to the period of the patient's life in which the compensation, so to speak, had not yet started to break down, *i. e.,* to the so-called normal period of the lives of such individuals and not to the actual mental disorder in the stricter sense.

"In this very period, however, there are frequently noted milder traits of a defect of adaptation which still require more careful description and study than have hitherto been given them. While we have developed the guide in connection with an attempt descriptively to correlate the milder abnormalities and the psychoses, we have had in mind also studies which aim at a clearer clinical description of these milder traits with special reference to singling out reactions appearing in very early life which may serve as signals, warning of future nervous or mental ill health. We hope, therefore, that the guide may be of use in the study of abnormal and nervous children.

"We have mentioned the fact that we were particu-

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(4) State Hosp. Bull. (N. Y.), November, 1913.

larly interested in the more affective reactions of the individual. It is important, however, first to inquire into those traits which primarily refer to the intelligence and the relative capacity for the output of energy and activity. In both these fields we find, of course, that affects may exert a very decided modifying influence. Nevertheless, they represent the most easily accessible measures of native endowment of the individual, and furnish in practical work a valuable indication of the general level on which the individual stands. An inquiry into traits referring to this field should, therefore, form a starting point in the sizing up of the personality. We try to get an estimate of the capacity of the subject for acquiring knowledge, of the traits referring to judgment, and of indications which the standing in school, or later in life, the efficiency in work as well as the general sizing up of the individual's 'sense' by his friends, etc., furnish us. The second section of the guide refers to the habits of the individual in the output of energy."

The text of the "guide" itself is as follows:

### I. TRAITS RELATING ESSENTIALLY TO THE INTELLIGENCE, THE CAPACITY FOR ACQUIRING KNOWLEDGE, THE JUDGMENT, ETC.

How easily did he learn,—was it necessary for him to study very hard to keep up in school?
What was his standing in school? (School records.)
Did he keep up with his classes? If not, what was the apparent reason?
What did his teachers say about him?
Was he proficient in some subjects,—deficient in others?
Is his education up to his opportunities?
Is his power of attention and concentration good or bad?
Does he observe well?
How capable is he in positions?
Is he considered to have good common sense?
Is his advice sought by others?
Is he quick, impulsive or deliberate in his judgment?
Is he definite or vague of purpose?
Does he plan with good foresight?
How practical is he? Can he use tools well?

### II. TRAITS RELATING ESSENTIALLY TO THE OUTPUT OF ENERGY.

In childhood was he lively, active at work or play,—or lazy and sluggish?
In his play as a child what did he prefer? Did he exercise much imagination in it?
Is he naturally talkative or inclined to be silent?

Is he energetic, slow or sluggish?

Does he show a tendency to overactivity,—to much push and tension?

Is he active or overactive by fits and starts?

Does he spend his energy sensibly or in a desultory way?

### III. TRAITS RELATING ESSENTIALLY TO THE SUBJECT'S ESTIMATE OF HIMSELF.

Is he self-reliant or self-depreciative (feeling of inferiority)?

How dependent is he for his comfort on the opinions which others have of him?

Is he conceited, egotistic,—given to self-admiration? Is he vain, proud?

Does he pay unusual attention to his dress,—is he foppish?

Is he honest with himself,—does he emphasize his dislike for sham?

Does he seem to be genuine?

Does he blame others for his faults?

Is he inclined to pay much attention to his aches and pains,—inclined to self-pity?

### IV. ADAPTABILITY TOWARD THE ENVIRONMENT.

#### (a) *The More Striking Traits which on their Abnormal Side Interfere in a Rather General and Striking Way with Contact with the Environment.*

Is he sociable, easy to get acquainted with, or does he hold people off?

Does he make friends easily?

If he prefers to be alone, how does he rationalize this? Are there special circumstances under which he goes away by himself (*e. g.*, when reprimanded, criticized, or when something is required of him)?

Is he bashful,—at ease with strangers? Is there a marked difference in behavior in his intercourse with friends, family, or strangers?

When a child did he play freely with other children?

#### (b) *Traits which in a More Specific, but in a Less Obvious Way Interfere with Contact with the Environment.*

Is he selfish, or sympathetic, kind-hearted, altruistic?

Is he generous or penurious?

Has he genuine respect for the rights of others?

Is he tactful or offensive?

Is he quarrelsome, or easy to get along with?

Can he co-operate with others?

Does he want his own way?

Was he obedient when a child?

Is he inclined to criticize others much?

Does he take advice well, or does he always think he is in the right?

Is he stubborn,—set in his opinions?

Does he allow his mistakes to be pointed out to him?

Is he apt to blame others for his own mistakes?

Is he trustful or suspicious?

Is he resentful or forgiving?

Does he hold grudges long?

Is he easily offended?

Does he see slights when none are intended?

Is he jealous or envious?

Does he think the world treats him ill?

Does he feel satisfied with his environment,—does he feel above it?

Does he readily adapt himself to new environments (as being away from home, moving to new places, etc.)?

(c) *Traits which Show to What Extent the Subject Lays Bare to Others his Real Self.*

Is there much known of his inner life, his views, his mental attitudes?

Is he frank and open?

Has he or has he not a tendency to unburden himself to other people, or special people?

Is he demonstrative?

If reticent, is he reticent generally or in relation to certain topics? Is he more frank to certain people?

(d) *Traits which in Normal Proportions are Useful Qualities, but in Exaggerated Form Interfere with Efficiency.*

Is he conscientious,—has he a natural feeling of responsibility, or is he unusually scrupulous?

Is he easily blocked in his activity by scruples and doubts?

Is he committed to a routine, or is he free and agile mentally?

Is he finicky in his demands for precision, system or order?

Does he show an exaggerated demand for truthfulness and justice?

(e) *Traits which Show a Tendency to Active Shaping of Situations, or the Reverse.*

Is he inclined to be a leader or inclined to be led?

Does he show much demand for self-assertion?

Is he courageous or cowardly?

Is he imitative,—suggestible?

(f) *Traits Showing the Attitude Toward Reality.*

Does he take things as they are, or as he wants them to be?

Is he phantastic or over-imaginative?

Is he inclined to build air-castles; how strong is the tendency to, and how much satisfaction does the subject get from, day dreaming?

Is he truthful or apt to lie?

V. MOOD.

Is he cheerful, light hearted?

Is he serious or not inclined to take anything seriously?

Is he enthusiastic?

Is he jovial, bubbling?

Has he good sense of humor?

Is he optimistic,—hopeful?

When such traits are present, are they more or less habitual, or do they come out only under certain circumstances?

How does he react to pleasure, good news, success? (Description of reaction.)

Is he despondent; has he a tendency to look on the dark side,—brood?

Does he get despondent without apparent reason?

Are there any topics he is especially inclined to worry about?

When such traits are present, are they more or less habitual, or do they come out only under certain circumstances?

How does he react to real trouble, such as bereavement, failure or success, responsibility? (Description of reaction.)

Does he make attempts to overcome his despondency or worrying?

Does he crave sympathy in his depression?

Does he seem to enjoy his discomforts?

Is he stable or variable in his mood, away up or away down?

Does his mood change easily?

Is he easily frightened?

Has he a tendency to anxiousness,—to forebodings?

Are there special topics which bring out his anxiousness?

When anxious, what is his reaction?

Has his mood apparently been permanently influenced by any special occurrence or circumstance?

Is he irritable, quick tempered?

Are there special topics or circumstances which irritate him?

How does he react when irritated?

Does the irritation last long?

Did he have tantrums when a child?

Is he patient?

Is he sensitive, touchy?

Is he fault-finding?

Is he phlegmatic,—indifferent? Has this existed since childhood?

## VI. INSTINCTIVE DEMANDS, TRAITS WHICH ARE MORE OR LESS CLEARLY RELATED TO THE SEXUAL INSTINCT.

### (a) *Friendship.*

Is he affectionate, demonstrative, or is he cold?

Does he have many friends, or is he whimsical in making friends?

Does he keep friends long, or does he give them up on slight provocation?

Is he sentimental in his friendship?

What qualities in others attract him?

### (b) *Attachment to Members of the Family.*

Does he resemble in his ways and characteristics other members of the family?

Does he show any marked preference for, or great dependence on, any member of the family, or marked antagonism? (Father, mother, older or younger brother or sister.)

Has there been a change in this respect between childhood and adult life?

What was his reaction to the death of any member of the family?

### (c) *Attitude Toward the Other Sex.*

#### (1) *General.*

Is his personal attitude in harmony with his own sex? (Tomboy, sissy, mother's boy, mannish, effeminate.)

Is he natural and at ease with the opposite sex?

Is he or is he not especially attracted by the opposite sex?

Is he attracted by older or younger persons of the opposite sex?

Did he have many, few, or no love affairs?

Did the love affairs go deep, or were they rather perfunctory?

Is he sentimental?

When love affairs were broken off, what was the reason?

What was the reaction toward disappointments in love?

Was he decided or wavering when the question of engagement or marriage came up?

In marriage or other similar relationships, what is the attitude toward the partner? Is he affectionate, kind, or dissatisfied, irritable, fault-finding, jealous, over-anxious, indifferent, domineering,—or, on the other hand, very submissive?

Is there, or is there not, a desire for children?

(2) *Specific Sexual Demands.*

Is the demand for sexual gratification great or small? (Potency, psychic impotence, ejaculatio precox, frigidity)?

Does the subject masturbate? If not, has he never masturbated, or when did he stop?

Are there any perversions?

(3) *General Traits Derived from Sexual Instinct or Reactions against its Assertion.*

Was there much sexual curiosity?

Does he talk much of sexual matters,—tell suggestive stories.

Does he indulge in gossip with a sexual coloring?

Is he particularly innocent, modest, prudish?

Does he show a special demand for nicety, neatness, cleanliness, moralizing?

Is he easily disgusted?

Are there any idiosyncrasies toward food or odors?

Is there any special tendency to cruelty, plaguing, tantalizing?

VII. GENERAL INTERESTS.

Is he interested in his work,—does he get satisfaction from it, or from other pursuits?

Is he ambitious, and in what direction?

To what extent has he been able to satisfy his ambition?

Is he interested in sports or other diversions?

What are his hobbies?

Has he any fads?

Does he read much, and what is the character of his reading?

Is he religious, does he get comfort from his religion, or is his interest merely superficial?

Does he show any vague gropings, such as spiritualism, occultism, theosophy, "deep subjects"?

Is he superstitious?

In what does he get his deepest satisfaction?

VIII. PATHOLOGICAL TRAITS.

Without going into the history of the disorder, it will often be found useful to amplify the guide by statements concerning more frankly pathological features,—such as criminal tendencies,

tendencies to hallucinate without definite psychosis, phobias, disorders of appetite and sleep, night terrors and anxious dreams, nocturnal enuresis, tics, etc.

**Psychopathic Children. What New York City is Doing for Them.** This is the title of a paper by L. Pierce Clark,[5] who approaches the subject along lines similar to those laid down by Hoch, as will be seen from his opening sentences:

"In order that one may understand the motives in the present movement to study and prevent the psychopathies of children, we should see clearly the reasons for such work. The psychiatrist has long realized that out of the earliest maladaptations of the precox and many allied states, much of the symptomatology and innate defects of the patient have flowed, and that more intensive study of child, and even infantile life, is necessary to understand properly and gauge the psychiatric issues concerned. The trends in this direction are well shown in Meyer's precox studies, and Hoch's effort to elucidate the developmental facts in his personality studies. Those of us more immediately concerned with the interpretation and treatment of functional nervous disorders, such as the psychoneuroses, have realized the absolute necessity of a knowledge of the subsoil of habit, manners, and conduct in the neurotic make-up, as well as in the normal child."

The Department of Education of the City of New York has now established a mental clinic "for the intensive study of abnormal children, such clinic to be not alone for the backward and mentally defective child, but for all the nervous and mentally disordered children who are hampered or prevented from obtaining an education, the inherent birthright of every American child." After outlining the scope of this clinic, the author makes the following general suggestions, which are applicable in any large city:

"To summarize, then, all public schools in the large cities should have a department for clinical study of the frank psychopathies of school children, because the school is in close touch with the child and the parent, and enjoys the utmost confidence of the public. It has

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(5) New York Med. Jour., April 11, 1914.

the training equipment, the personnel, and the financial support adequately to meet the issues concerned in understanding the nature and degree of retardation of perversion of mental development. The school should call for the coöperation of physicians, sociologists, and psychologists—specially trained pedagogues to unravel the difficulties of teaching psychopathic children. The whole scheme calls for our hearty support, as it is in line with the trend of the best thought today to study the beginnings of mental disorders in order that the best means may be forthcoming for preventing the nervous and mental disorders of adult life.

"In order that one may understand our tentative plan of study of the individual child, a few notes will be given of the general routine inquiry of cases coming before the clinic.

"First, the child's main difficulties are outlined, to find out whether these difficulties lie in the intellectual or the emotional field, such as backwardness in certain studies, or whether he exhibits antisocial traits in the home, or at school, among his comrades, on the street, etc. These facts are briefly stated as a text for inquiry. Then follows a statement, more or less detailed, of the reasons for excluding him from the normal grade in school, which practically amounts to a categorical list of his intellectual and emotional deficiencies. In addition thereto, note is made of the kind of school work the child is best fitted to do, and what he shows the most liking for, it being recognized that the study in which indifference or disinclination is shown is the most hopeless. Miss Farrell, who is in charge of the ungraded classes, has planned to group delinquent children on the basis of their similarities of what they *can* or *like* to do, the *positive* characteristics, rather than upon the *negative* side of what they *can not* do, as has obtained in many schools heretofore. The plan is a good one, and promises well in the constructive betterment of psychopathic children in general.

"Next in the examination, a number of intellectual tests are employed, such as the Simon-Binet, the Healy puzzle board, etc. These are used only for more specific helps in detecting the more glaring defects, and to give the clue to finding the possible way to direct future plans of educational training, and although such tests are of great assistance, they have their definite limitations and often render one satisfied with but a superficial view of the case.

"The examination then moves on to summarize the experimental and actual efforts of the child in the short period of study and observation in the ungraded classes. A family history follows, which is made up of data obtained from parents by the physician, and social workers who visit the children's homes. In dealing with functional nervous disorders in the clinic, it has been found best to inquire carefully into the character, temperament, adaptations, and adjustments of the individual members of the family, rather than to confine oneself to a mere detailing of definite disease entities, which latter procedure is insufficient in dealing with psychopathies of children, although the method may have been quite satisfactory in dealing with organic or structural diseases of the nervous system. Concerning some of the suspicious members of a family, a request for a brief account of their lives has been a help where dry questions have proved negative. There is no doubt in our minds that inquiries regarding the hereditary peculiarities of temperament from which many of the psychoneuroses and antisocial trends of children flow, will be the better understood when we direct the family inquiry upon traits or trends of conduct, the habits and behavior, and learn to avoid disease entity labels—in other words, we should strive to handle the psychopathies on their own plane of perversion of instincts and conduct, which is also the trend of investigative methods in modern eugenic studies.

"The personal history is next taken up in chronological order, and is largely confined to data concerning the physical development of the child. It has been found best to take up the mental development under the subsequent heading of *mental examination.*

"The physical and neurologic examination is similar to that pursued in any good clinic, and does not warrant being detailed here. While the greater stress is, obviously, laid on the examination of the mental mechanisms concerned in the psychopathies, the bearing which physical conditions have in such disorders is always kept in mind, and careful note is made of them so that the investigation may be broad and comprehensive in future studies.

"We now take up the mental examination. It is held that the first principle in the observation of psychic condition is to describe accurately, and to present the facts so they can be used in a reconstruction of the development of the disorder."

After discussing the details of the proposed mental examinations, the author continues:

"Not the least valuable part of the further record of the child is the embodiment of the social report on the environmental, social and economic conditions of the child's home. Such often modifies our view of the psychopathy to a great extent, and especially do we find it invaluable in outlining a recommendation of constructive correctional and training treatment for the child in the school.

We may now summarize our tentative scheme for examination of psychopathic children as follows:

NAME, AGE, FATHER'S AND MOTHER'S NAME, ADDRESS.

The Child's Main Difficulties.

School Record in Normal Classes.

Intellectual Tests: *Simon-Binet and its modifications.*

Family History. *Data obtained from parents by physician and social worker.*

Personal History. *Chronologic physical development of the patient from birth, made up of facts obtained by physician, social worker, and from parents.*

Physical and Neurologic Examination.

Mental Examination. *Inquiries and observations regarding general appearance, manner, conduct, etc. Mental development of infancy and childhood. Personality study. Patient's own story in regard to his difficulties and how he thinks they may best be set right. Social report on environmental, social, and economic conditions.*

Other Facts Concerning the Child.

Summary of the Case.

Treatment and Correctional Methods Recommended.

Observation in Ungraded Class.

Results of Re-examination.

Finally, three cases are reported to illustrate the application of the principles laid down above.

**A Statistical Study of Prognosis in Insanity.** A. J. Rosanoff[6] made an investigation of the outcome of all cases of first admission to the King's Park State Hospital (N. Y.) during the year ending Sept. 30, 1908. The investigation involved ascertaining the condition of these patients in September, 1913, or five years later. In this very objective manner data were obtained which are of considerable general interest. The main facts established are summarized by the author as follows:

1. At the end of five years, one-fourth of all first admissions have died, a little over one-third have been discharged, and about one-third are still in the state institutions. These results are, however, very unequally distributed among the various clinical groups, as would indeed be expected.
2. Taking into consideration only the more important clinical groups, it will be seen that death is the typical termination for patients with senile psychoses, general paresis and cerebral arteriosclerosis; discharge into the custody of self, relatives or friends for alcoholic psychoses, psychoses "allied to dementia precox" and manic-depressive and allied psychoses and continued residence at the hospital for dementia precox and paranoic conditions.
3. Aside from the patients who survive and remain as prolonged institution residents, the termination of treatment in the average case has been before the expiration of the first year of hospital residence, namely, at the end of ten months, eleven days.
4. Nearly one-half of the patients in the group "allied to dementia precox" have been discharged as recovered, many of those being placed in that group instead of the "straight" group of dementia precox for no other reason than that of their eventual recovery; moreover, a percentage of these patients higher than the average find their place at the end of five years under the heading "Not Known to Have Been Re-admitted."
5. Four per cent. of the cases in the manic-depressive group and over 17 per cent. of those in the group allied to manic-depressive psychoses are still in the institutions at the end of five years.

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(6) Jour. Amer. Med. Ass'n., January 3, 1914.

6. Of all the patients discharged into the custody of self, relatives or friends nearly 20 per cent., and possibly more, have been re-admitted within five years.

7. The distribution of the causes of death is abnormal in comparison with general mortality statistics; of the 153 deaths no less than 112, or 73.2 per cent., are due to but four principal causes—general paresis, broncho-pneumonia, pulmonary tuberculosis and acute enterocolitis.

**The Relationship Between Gynecological and Nervous and Mental Diseases.** The ever-present problems suggested in the above title are well stated in the following introduction to a paper on this subject by W. P. Graves[7] of Boston:

"An intimate relationship between the female genital organs and the nervous system has been recognized from the earliest times. Hippocrates regarded the uterus as the starting point of most nervous manifestations, and named from it one of the commonest of nervous diseases. This ancient idea was held with little modification up to comparatively recent times. In the middle of the last century such well known writers as Scanzoni, Amann, Romberg and Leubuscher, described hysteria as a "reflex neurosis resulting from genital irritation," and agreed that "every pathological change of the uterus, ovaries and tubes may be the precursor of hysteria." Even at the present time the celebrated Italian gynecologist, Bossi, is advocating by a prolific amount of literature the theory that minor gynecological lesions are the direct underlying cause of serious nervous and mental conditions.

"An exaggerated conception of a direct relationship between pelvic abnormalities and nervous disease has led in the past to grave errors and has been the means of casting much discredit on the science of gynecological surgery. In the earlier days operations for lacerated cervix and later, ventral suspensions of the uterus, castrations, nephropexies, resections of cystic ovaries have been done by the thousands for the relief of nervous symptoms without sufficient surgical indication. In most recent times the same tendency has been seen in the ex-

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(7) Boston Med. and Surg. Jour., October 16, 1913.

citement over autointoxication, enteroptosis, Lane's kinks and Jackson's membrane, etc., in which the relationship between abdominal aberrations and nervous manifestations has been often greatly exaggerated and many useless operations have been done. On the other hand the neurologists alarmed by this *furor operandi*, and impressed by the numerous surgical failures, have also erred and attempted to cure by long-drawn-out psychotherapeutic treatment, cases which in reality require surgery. In other words, there has been too little team work between the surgeon and the neurologist and it is the object of this paper partly to emphasize this fact and partly to make certain suggestions by which we may come to a truer understanding of that difficult class of patients which requires both gynecological and neurological treatment.

The well known influence of menstruation inaggravating existing abnormal nervous and mental conditions and morbid tendencies is commented on in the following quotations from Havelock Ellis contained in the paper by Graves:

"Lombroso found that out of 80 women arrested for opposition to the police, or for assault, only nine were not at the menstrual period. Legrand du Saulle found that out of 56 women detected in theft at shops in Paris, 35 were menstruating. There is no doubt, whatever, that suicide in women is especially liable to take place at this period; Krugeltein stated that in all cases (107) of suicide in women he had met with, the act was committed during this period, and although this cannot be accepted as a general rule (especially when we bear in mind the frequency of suicide in old age), Esquirol, Brierre, de Boismont, Coste, Moreau de Tours, R. Barnes, and many others have noted the frequency of the suicidal tendency at this period. In England, Wynn Westcott has stated that in his experience as a coroner, of 200 women who committed suicide, the majority were either at the change of life or menstruating; and in Germany, Heller ascertained by post-mortem examination of 70 women who had committed suicide that 25 (or in the proportion of 35 per cent.) were menstruating, a considerable proportion of the remainder being pregnant or in the puerperal condition.

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"Among the insane, finally, the fact is universally recognized that during the monthly period the insane impulse becomes more marked, if, indeed, it may not appear only at that period. 'The melancholies are more depressed,' as Clouston puts it, 'the maniacal more restless, the delusional more under the influence of their delusions in their conduct; those subject to hallucinations have them more intensely, the impulsive cases are more uncontrollable, the cases of stupor more stupid, and the demented tend to be excited.' These facts of morbid psychology are very significant; they emphasize the fact that even in the healthiest woman a worm, however harmless and unperceived, gnaws periodically at the roots of life."

Much of the paper is devoted to the milder nervous symptoms in connection with menstruation and the menopause. The author's experience and views on the relationship between gynecological disease and psychoses are related:

"On the subject of the true psychoses in their relationship to gynecological disease I cannot claim to speak with great authority on account of a limited experience with cases of this kind and on account of lack of familiarity with mental disease. Nevertheless I have had a number of instructive cases from which conclusions of some value may be drawn. The series which I have chosen to illustrate this subject consists of fifteen psychosis cases in which the operation of hysterectomy with castration was performed. All of these patients were suffering from some gynecological disease such as pelvic inflammation, fibroids, or severe dysmenorrhea. In all these were serious exacerbations of symptoms during the menstrual period, and in some the symptoms appeared only at that time.

"The mental conditions represented were as follows: Hysteria, five cases; epilepsy, four cases; insanity of the melancholic or depressive type with suicidal tendency, five cases; dementia precox, one case.

"Of the five hysteria cases three were much improved and two may be regarded as perfectly well. One of the cases which is entirely cured suffered from incessant epileptiform seizures which could with difficulty be distinguished from true epilepsy. The operation was for extensive pelvic inflammatory disease.

"Of the four cases of epilepsy there have been no cures; but all have been improved, two of them markedly so and the other two moderately.

"Of the five melancholic or manic-depressive cases, all have been very distinctly improved, while one is completely well though her mental condition before operation was the least promising, suicide having been twice attempted.

"The dementia precox case was improved temporarily; but has since lapsed to her former condition.

"It is sufficiently evident from this small series of cases that the performance of gynecological operations cannot be expected to cure true psychoses, but they may greatly improve the mental condition by removing the pelvic irritation of pain and discomfort, while in certain cases, which from the standpoint of the psychiatrist are essentially curable, operations may greatly facilitate or hasten a complete cure.

"I wish to say in conclusion that the remarks in this paper touch only in a most superficial way a subject of the widest importance and one capable of very great development. It has been my desire chiefly to emphasize the point that there exists no mysterious or peculiar nerve connection between the female genital organs and the central nervous system, and that disturbances in the former cause manifestations in the latter by the irritation of pain and discomfort. It seems to me that if this simple theory be borne constantly in mind in our practical treatment of patients there will be fewer mistakes on the part both of the gynecologist and the neurologist."

**The Relation of Sex to Crime and Insanity** is one of the topics taken up for discussion by F. W. Mott[8] in an address entitled "The Neuropathic Inheritance in Relation to Crime and Insanity," delivered to the Eugenic Society of Liverpool.

"With the dawn of the sexual passion at puberty a new

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(8) Liverpool Medico-Chirurgical Jour., January, 1914.

and intense emotional phase of character occurs, which, even when it is mature and developed may not be shown in daily conversation, yet as a deep and silent undercurrent of consciousness and silent thought it is continually influencing character and behavior. Now and again it reveals itself by springing to the surface and bursting the bonds of social usages in a flood of passion. In the majority of civilized people, especially women, this silent undercurrent of sexual passion, although not manifest to the external world, nevertheless occupies a large place in the conscious and subconscious self; it suffuses silent thought and consciousness with an emotional tone which may find outward expression in æsthetic and religious observances; its suppression is one of the causes of insanity, especially in subjects with the neuropathic taint, for it tends to mental depression, and this again reacts on the bio-chemical relations of the whole body.

"It is to be borne in mind that there is as radical a biological difference in the mind of woman and man as there is bodily difference, and this different mental attitude peculiar to sex shows itself in various ways. A woman is more impulsive, sentimental, and emotional than a man; she is intellectually different, for she has a naturally quicker perception and association of ideas, and trusts rather to intuition than deliberation in forming a judgment. Consequently it may be inferred that she has a less stable mentality than man; it is not surprising, therefore, to find that functional nervous diseases and disorders of the mind are much commoner in women than men, and that our asylums have more females resident than males.

"If an inborn tendency is the main cause of criminality, as some authorities, like Lombroso and his followers, assert, why should the proportion of female criminals be infinitely less than that of males?

"Sir Bryan Donkin informs me that the total average population in local prisons for the year ended March 31, 1913, was 13,159 males and 2,375 females. Of course the population is a shifting one: 143,718 males and 38,581 females were received during this period with sentences of very different length. Among the females a very considerable proportion are recurrent "drunks," and do not represent at all accurately the relative numbers of individuals convicted. To all who are interested in the question of crime and punishment I would recommend the reading of 'Some Thoughts on the State Punishment of Crime' by Sir Bryan Donkin in a recent number of *Bedrock*. In this article the author points out that 'one of the most important results of the passing into law of the "Mental Deficiency Bill" will be the legal recognition of grades of responsibility that are now ignored and a consequent diminution of crime, as well as a better and more rational treatment of many irresponsible criminals.' I have myself met with many cases of imbeciles and lunatics who have served several terms of imprisonment before it was discovered that a lunatic asylum was their proper destination.

"Although the female characters of mind appear to predispose to insanity, either there must be some innate disposition of the sex which counterbalances those qualities tending to mental instability and lack of control, or it must be concluded that the major portion of crime is a social product. In my judgment both causes serve to explain the proportional disparity of crime in the female as compared with the male sex. Nevertheless it is an undoubted fact that crimes of violence inspired in men by hatred and vengeance are frequently directly or indirectly caused by women, hence the truth of the saying, 'Cherchez la femme.'

"Now, what are the acquired and innate qualities of woman which tend to counterbalance the before-mentioned inborn characters of the woman's mind that predispose to nervous and mental disorders? The woman is animated by vengeance and hatred equal to and even surpassing that of the man, but physical inferiority combined with fear leads her to compass her end through the man. The woman is more altruistic and less egoistic in feeling than the man; she is unconsciously far more self-sacrificing, and by virtue of the maternal instinct more attached to home life and her children; she is more religious and feels greater respect for public opinion, social customs and usages and traditions; and by her attachment to home and family she is less exposed to temptations to drink, gambling, fighting and immorality.

**The Use of Continuous Baths in the Insane,** according to the German psychiatrist, W. Weygandt,[9] has two principal purposes: the quieting effect on excited mental states, and the prevention and healing of several cutaneous affections. It is especially in the excited state of manic-depressive insanity that the prolonged bath has an almost specific influence. It is also extremely useful in the excited states of the catatonic and the paretic patients. It is less effective in the excitement of idiots, especially when expressed in rhythmic motion, and is also of limited usefulness in epileptic fury and in the state of excited fear occurring in depressed patients.

Various physiological studies have been made in order to determine the cause of the sedative effect of prolonged warm baths. Thus Glamser studied the effect of warm and cold baths on the circulation of the brain in persons with cranial defects and found narrowing of the vessels to occur during warm baths and marked dilitation during cold baths, and W. Alter found diminution of blood pressure with diminished intensity of the entire cardiac activity, including slowing of the pulse rate, during warm baths, and he corroborated Glamser's observation of narrowing of the brain vessels. Graham-Brown found by means of the aesthesiometer diminished cutaneous sensibility and striking diminution of the strength of the grip as measured by the dynamometer. Weygandt finds that the use of prolonged baths in noisy wards of insane institutions reduces the necessity for hypnotics and sedatives to a minimum and isolation of patients becomes entirely unnecessary. The effect on the appetite and sleep of the patient is excellent. Increase in weight is also attained.

Opponents to the use of continuous baths base their objections on the supposed occurrence of fainting, on the production of so-called bath eczema and an increased liability to pulmonary infections. Weygandt has only rarely seen light attacks of fainting but naturally urges caution in patients with a weak heart. On the other hand, he finds no foundation for the popular fear of baths during menstruation. Skin affections may occur but are avoided by the use of fat or a mild antiseptic

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(9) Med. Klin., April 26, 1914.

salve. Some men have warned against keeping patients with furunculosis in prolonged baths, but Weygandt agrees with Beyer, whom he quotes as mentioning furunculosis as a particular indication for the use of the baths. He has not discovered any resulting increased tendency to serious pulmonary affections.

Even more brilliant than the effect of the baths in inducing quiet sleep and increased appetite is their usefulness in the prevention and cure of important cutaneous complications. Of greatest importance is their use in preventing bedsores, especially in patients with incontinence of urine and faeces, and also in excited patients who are prone to injure the skin by rubbing or bruising exposed parts when in bed. If bedsores already exist they often heal with most surprising rapidity when continuous baths are used. Ulcers of the skin, furuncles and injuries also usually heal rapidly. Weygandt is convinced that the lives of many patients, particularly paretics, have been prolonged for years by means of these baths.

The equipment and technique necessary for obtaining the best results are discussed. The temperature should be from 1 to 2 degrees below body temperature. Needless to say, the control of the intake of water must be such that too hot water can not enter the tub and automatic signals should be installed to call the attention of the attendant whenever the temperature of the water is too high or too low. Thus Weygandt has installed a kind of siren which sounds in the bath room when the temperature of the water in the tub reaches 38° C. and which sounds both in the bath room and in the office of the superintendent of nurses when it reaches 40° C., in which case the latter is expected to discipline the bath attendant.

The patients eat their meals in the baths and sometimes read, smoke or play games.

**Treatment of Mental Diseases With Nucleinic Acid.** For many years more or less good results in the treatment of various chronic mental diseases have been reported following infection of substances which produce a febrile reaction. Originally the incentive to this method was furnished by the occasional improvement in chronic mental cases following acute infections, such as erysipelas or pneumonia. Tuberculin and nuclein compounds have been most frequently employed. Franz Hauber[1] reports a large series of observations. Merck's sodium nucleinate was used, at first in 2 per cent. solution, later 10 per cent. The injections were given from four to eight days apart. The patients first treated received from 8 to 12 gm. of nuclein in the whole course, later ones received from 20 to 25 gm. In a few paretics even 45 grams were given. The paretic patients at the same time were treated with mercury and salvarsan and some of the dementia precox patients with thyroid. The desired fever and leukocytosis were usually promptly obtained and irrespective of the kind of mental disease present. That the method is not without danger is admitted by Hauber, who several times observed the lighting-up of a latent tuberculosis and the appearance of threatening circulatory weakness in cases of myocarditis or of aortic aneurysm. Two paretic patients, after the first series of injections, died of severe diarrhea, which was not influenced by treatment. However, the author found that the general condition of the patients as a rule was improved. As to the effect on the mental condition, he reports that of thirty-six individuals with paretic dementia, twenty-three were not influenced and thirteen were decidedly improved so that eleven of them could be discharged. However, six of the patients discharged later returned and in only four cases was improvement of prolonged duration. Hauber believes that this treatment merely tends to bring about remission, to diminish the tendency to acute exacerbations and thus, in a general way, prolong the life of the paretic patient. Of twenty cases of dementia precox, ten were not influenced and seven patients were sufficiently improved to be discharged. In two, the treatment has not been completed and in one case it had to be discontinued on account of the lighting-up of a previously latent apical tuberculosis. On account of the small number of cases and the tendency to spontaneous improvement in dementia precox

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(1) Zeitschr. f. d. gesamte. Neurol. u. Psychiat., 1914, vol. 24, page 1.

the author hesitates to draw any conclusions, but expresses a hope that this treatment may increase the tendency to remissions. In the six cases of manic depressive insanity the method was difficult to carry out and no promising results were obtained, so the author discontinued the method in the cases of this kind.

**Therapeutic Experiments with Injections of Magnesium Sulphate in Insane and Epileptic Subjects** are reported by M. Thumm,[2] who had received his stimulus from the early animal experiments made in this country by Meltzer and Auer[3] and the successes reported in tetanus, chorea, spasmophilia and various states of excitement in imbeciles. The author used the method in twenty-three patients, all of whom received intramuscular injections of 25 per cent. aqueus solution of magnesium sulphate on ten successive days; the first time 5 c.c., the following days 10 c.c. In three cases intravenous injections and in one case intraspinous injections were also given. The results are summarized as follows:

1. No reliable sedative and hypnotic effects were obtained by intramuscular injections in excited mental states.
2. As an antispasmodic in epilepsy intramuscular injections have failed and the experiments were discontinued, as the apparently lessened severity of the attacks in a few cases was more than offset by the subsequent almost constant increase in the number of attacks.
3. In one case of status epilepticus intraspinous injection had a prompt but purely symptomatic and transient effect.
4. Undoubted favorable results from intramuscular injections were seen in mental defectives of the choreiform type and some good effects also in somewhat similar states in dementia precox. Good and lasting results were obtained in a pronounced case of generalized tic following epilepsy. The intravenous administration showed no decided advantage.
5. No dangerous sequelae were observed with any of the methods used, but the intramuscular method is con-

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(2) Zeitschr. f. d. gesamte. Neurol. u. Psychiat., 1914, vol. 24, p. 38.

(3) Amer. Jour. Physiol., 1905, vol. 16, p. 233.

sidered preferable if it is found advisable to employ injections of magnesium sulphate at all.

**Sudden Death in the Insane.** For years attention has been given to the baffling cases of sudden death after a brief state of mental excitement in which the cause of death is not cleared up at the necropsy. Such cases are described in the literature under various names, such as "acute fatal hysteria," "acute fatal insanity" and "delirium acutum." This subject is taken up for review by E. v. Klebelsberg[1] of the staff of the Insane Hospital at Hall, Tyrol (Austria), who also adds eight cases of his own, all with necropsy. In most of them no obvious cause of death was found. Certain features were frequent: swelling of the lymphatic apparatus (tonsils, follicles of intestine and spleen, mesentine glands, etc.); narrowing of the aorta and other vessels; changes in the adrenals; hypertrophy of the heart; malformations; hypertrophy of the thymus, etc. In other words, we encounter here the condition known as "status lymphaticus" or "status thymico-lymphaticus." For years sudden death in children, after violent symptoms of suffocation coming on in the midst of apparent health, has been found to be associated with enlargement of the thymus. There has been much discussion as to whether death was caused in a mechanical manner by compression of the air passages or indirectly by some disturbance of the nervous system, especially of the nervous mechanism of the heart produced by abnormal thymus activity.

It is interesting to note that several observers have found the status thymico-lymphaticus in persons who have committed suicide. Thus Miloslavic[2] found the condition in 47 per cent. of 110 soldiers who had committed suicide and in addition, the status lymphaticus in 21 per cent. and status "thymicus" alone in 8.5 per cent. He believes that the lymphatic constitution with or without persistent thymus is the chief underlying factor in the "organic disposition to suicide." Klebelsberg mentions that in three suicides from his institution all showed

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(1) Zeitschr. f. d. gesamte Neurol. u. Psychiat., 1914, vol. 25, p. 253.

(2) Virchows Arch., vol. 208.

changes in the aorta and enlarged thymus. His eight cases of sudden death all occurred in patients with the clinical pictures of dementia precox or epilepsy and the association of both of these conditions with status lymphaticus has frequently been described.

[In his literature review Klebelsberg fails to mention the extensive and interesting, but to him probably inaccessible, investigations by A. P. Ohlmacher published in the "*Bulletin of the Ohio Hospital for Epileptics,*" 1898. Persistent thymus and lymphatic constitution are frequently encountered and sudden death in a condition of good general nutrition occurred in five of his cases.

"Of these five cases, three were males and two were females; four of them were in the third decade of life when death came, while one had just entered on the period of adolescence. All were afflicted with epilepsy, taking the type of 'genuine,' 'primary' or 'idiopathic' *grand mal* and in all this neurosis appeared in infancy or childhood. Two individuals (the women) were also subject to periodic epileptic mania. One of the men was in a state of beginning dementia resulting from long-continued and severe epilepsy; the other was sane but dull and slow—probably on the way to a state of secondary insanity, so common a phenomenon in adult epileptics; while the third individual, doubtless owing to his youth, had not yet suffered mental derangements.

"From the anthropometric standpoint these individuals had a certain resemblance in that they all exhibited the superficial evidence of the epileptic, or, as we now choose to regard it, the *lymphatic* constitution. They were all of that robust build and apparently well-nourished state that is so deceptive a feature of lymphatic individuals. The males would, in common parlance, pass as 'strong,' 'muscular,' 'athletic,' 'strongly built'—the women as 'plump' and 'well-formed.' With the exception of the boy, their features took a certain coarseness, with thick, sallow skin and muddy complexion so familiar to those who come in daily contact with epileptics and for which the term '*facies epilepticus*' or '*facies lymphaticus.*' is appropriate."—Ed.]

In some of the reported cases of sudden death in the insane, the brain has been very large in proportion to the cranial capacity so as to suggest the so-called brain-swelling of Reichardt, but also in some of these cases hyperplasia of the thymus and lymphatic apparatus have existed and it is an interesting fact that for many years various observers, beginning with Rokitansky, have called attention to the coincidence of brain enlargement and persistent thymus.

**Acute Brain Swelling as Cause of Death in the Insane.** Stefan Rosental[3] states that the subject of the so-called brain swelling of Reichardt remains somewhat obscure, as many of the reported cases do not stand criticism. Most convincing to him is a case of brain swelling following a catatonic attack in an old case of dementia precox reported in 1905 by Dreyfus. To prove the existence of an actual brain swelling Reichardt rightly demands that not only must the brain be weighed but the capacity of the skull must be accurately measured. Rosental describes the method used in connection with a case of fatal catatonia observed in Nissl's clinic in Heidelberg. The brain weighed 1590 gm. and showed marked flattening of the convolutions. The brain substance was unusually firm and there was no hydrocephalus. One method used for determining the exact capacity of the cranium was to make a cast of the base of the skull and another of the calvarium. In this manner the capacity of the cranium was computed to be 1590 c.c., which exactly corresponded to the weight of the brain. In order to make a determination by Reichardt's method by means of water it is necessary to saw the skull in an exactly horizontal plane, which had not been done in this case, but it was done in other cases in order to compare the two methods. It was found that the capacity measured by the water method was 5 per cent. greater than by the plaster method. At any rate there is no doubt that the case here described is one of brain swelling. The condition of brain swelling is said to exist when the difference between cranial capacity and brain volume is less than 6 per cent. In another case of sudden death during catatonic excitement brain swelling was also present, as the brain weighed 1560 gm. and

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(3) Neurol. Centralbl., June 16, 1914, p. 738.

the water capacity of the skull was 1624 c.c., giving a difference of only 4 per cent. However, in this case the brain did not show the characteristic flattening of the convolutions and firm consistence. The author discusses the condition in considerable detail and takes issue on many points with Reichardt, who recently has published a new contribution[4] on the subject. One of the difficulties is that to some extent the brain swelling may be a post-mortem phenomenon, but on account of the associated histologic changes and for other weighty reasons Rosental believes that at least in some cases the swelling has existed *intra vitam.*

**The Immigration Problem From a Psychiatric Standpoint.** In this country much attention has been given to the problem of regulating immigration with a view to excluding not only persons liable to become a burden on the community on account of physical or mental defect or illness, but also with the broader eugenic view to exclude persons not easily assimilable on account of various unsocial or other undesirable qualities. We are accustomed to hear this question discussed from an American viewpoint and it is therefore both unusual and instructive to discover a thorough analysis of the same problem by the director of a Hungarian insane hospital who has had this subject thrust upon him because a large number of Hungarian emigrants, rejected by the immigration officials in the United States, have been consigned to his care. Over half of this article, which is by Ladislaus Epstein,[5] is devoted to a careful review of the legislation, methods of inspection and statistics concerning immigrants, chiefly based on the annual reports of the Commissioner General of Immigration and the provisions of the Immigration Act of 1907. On the whole, Epstein displays a sympathetic attitude toward the efforts of the American officials, but on the basis of the extensive statistics contained in the American annual reports he points out certain facts which may surprise the average American not familiar with the

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(4) Arb. a. d. psychiatr. Klin. in Würzburg, VIII, 1914.

(5) Zeitschr. f. d. gesamte. Neurol. u. Psychiat., 1914, vol. 26, p. 156.

details of the statistics of his own country. He calls attention to the general apprehension created in America by the gradual change in the proportion of certain nationalities. While formerly the Germanic races predominated, the bulk of immigrants now is made up of Italians, Slavs and Jews. Epstein analyzes the statistical tables concerning immigrants debarred from entering the country and immigrants deported within three years, on account of mental disorders. Combining these two classes, the Irish come first with 0.23 per cent., Jews 0.21 per cent., Scandinavians 0.18, French 0.17, Germans and English 0.13, while the Poles give 0.09 per cent., Italians 0.08 per cent., Hungarians 0.07, Russians and Greeks 0.04 and of Roumanians, none were debarred on entering and only 0.02 per cent. deported.

Epstein calls attention to a similar study by Hamel and Lallement[6] made on deported emigrants received at insane hospitals in the vicinity of Havre. In the discussion of this paper several French psychiatrists spoke bitterly of the attitude of the United States, which was termed inhuman and egotistical. Epstein, however, while alive to the humane sentiments of these French alienists, approves of the American measures and agrees with the following statement by a German writer, Kurt Halbey: "Although the regulations are severe for the immigrants, and their enforcement in some respects extremely rigorous, we must admit that the measures taken by the American government to exclude worthless individuals incapable of making a living, are not only highly justifiable but necessary and commendable from the standpoint of the welfare of the people."

The well-known German psychiatrist, Weygandt,[7] examined 204 insane emigrants returned from the United States and other transatlantic countries and found that at least 127 belonged to the group dementia precox.

Epstein has made a thorough study of his own material of 103 cases, 42 men and 61 women; 41 were classified as dementia precox, 23 as "acute confusion," 12 paretic dementia, 8 chronic paranoia, 7 manic-depressive

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(6) L'enc'phale, 1910, Vol. 5 (II), p. 174.
(7) Münch. Med. Wochenschr., 1912, No. 2.

insanity. There were a few each of other psychoses and two were not insane when received. It is a striking fact that 24.75 per cent. of these individuals recovered, while the average percentage of recovery in the state institutions for the insane in Hungary is 5.43 per cent. The reason for this high percentage of recovery is the high proportion of acute psychoses in this group. Epstein gives a vivid picture of the emotions and hardships of the emigrants and of the bewilderment, perplexity, fears and suspicions to which these unfortunates so easily fall victim in the new and strange surroundings. Hence the frequency of states of morbid anxiety, of delusions of persecution, of the rôle of the ocean in the hallucinations, and the frequency with which these patients imagine hearing the voices of their dear ones. Numerous cases are cited the special features of which lead the author to conclude that there exists an "emigrant psychosis" which has its own characteristics in the same way as the better known and studied "prison psychosis." The principal causes of the emigrant psychosis are the internal and external events connected with the journey, accidents, deprivations, fright, grief, loneliness, difficulties in language, hard work, homesickness, all of these associated with physical strain and all kinds of mental excitement, sometimes also with the use of alcohol. This psychosis sometimes sets in before the emigrant reaches the seaport. It is then uniformly of acute type, of rapid course and favorable outcome; it usually has the picture of "dementia" (acute confusional insanity) with states of anxiety and the characteristic hallucinations and delusions mentioned. The latter symptoms are of brief duration and often subside quickly when the patient is returned to his own country. The associated symptoms of physical exhaustion, such as tremor of the tongue and hands and increased knee reflexes, also subside rapidly. A similar picture is seen in most cases in which the psychosis begins on the voyage or soon after the arrival across the sea. In the cases developing some time after landing we frequently have the same type, but there are also others, particularly the maniacal, depressed and paranoic groups.

## THE ABDERHALDEN TESTS.

**The Clinical Value of the Abderhalden Tests in Psychiatry.** The pioneer work by Fauser and others in the application of the Abderhalden dialysis tests in psychiatry was considered in the Practical Medicine Series, 1913, vol. X, p. 194. A spirit of hope and enthusiasm was created in the early workers, and, as usual in the history of new discoveries, time has now come to pause, to reflect, and to retract some of the customary hasty claims of the pioneers. Stefan Rosental and Walther Hilffert[8] of the psychiatric clinic of Heidelberg have submitted the methods of the pioneers to a searching criticism and have made the tests in sixty-two cases of dementia precox, twenty cases of manic-depressive insanity, nine cases of hysteria and seven normal persons. They unearth many sources of error which throw considerable doubt on the reliability of the uniformly positive results of Fauser in dementia precox. First of all, they were impressed by the variation in the porosity of the parchment thimbles used as dialyzers and they also convinced themselves that more controls at every step are necessary than laid down by Abderhalden. In their early work without these precautions their results resembled those of Fauser, but when all necessary safeguards were observed the number of positive tests became smaller and the number of partially positive reactions in functional cases so great that it was proven unwarranted to interpret similar incomplete reactions in the dementia precox cases as of positive value. Of their sixty-two dementia precox cases, 50 per cent. reacted positively against cerebral cortex, 29 per cent. against thyroid and 39 per cent. against the genital glands, while in the thirty-six normal and functional cases, 3 per cent. reacted positively with the cortex, none with thyroid and 8 per cent. with the genital glands. In the latter group the proportion of partial or doubtful reactions was about 30 per cent. against each of the three tissues. The authors deny the propriety of drawing any diagnostic conclusions from the Abderhalden tests in cases of mental disease; however, they admit that in a doubtful case positive

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(8) Zeitschr. f. d. gesamte. Neurol. u. Psychiat., 1914, vol. 26, p. 6.

tests with both brain tissue and genital gland, especially in the male sex, to some extent favor a diagnosis of dementia precox. It is encouraging that the authors express faith in the fundamental soundness of the principles underlying the tests and that further study and technical improvements will render the method clinically useful.

Charles E. Simon[9] of Baltimore reviews the literature fully and comments as follows:

In surveying the literature just outlined, one can not help being impressed, on the one hand, by the wonderful apparent uniformity of the results reported by Fauser, and on the other by the total lack of uniformity of those obtained by others, such as Hauptmann and Bumke. The thought naturally suggests itself that two factors may have been operative to this end, namely, that Fauser was carried away by his enthusiasm and allowed himself to be influenced unduly in the direction of his own wishes, and that Hauptmann and Bumke lacked complete control of the technique. As a matter of fact, there is good ground for the belief that both factors were operative. Fauser himself states that he obtained a reaction with sex gland repeatedly in cases in which this "was not expected or at least not certainly expected"; that in the cases in question, either the diagnosis between manic-depressive insanity and dementia precox could not be made with certainty, or the diagnosis of manic-depressive insanity seemed to be the only diagnosis warrantable. He adds that in just such cases the serologic diagnosis proved superior to the clinical diagnosis, as evidenced by the subsequent course of the malady or the added information brought out by a more searching investigation into the patient's history. Fauser, in other words, admits that he tried to make his clinical diagnosis fit the serologic one in cases in which the two did not tally, rather than leave the question of the occurrence or non-occurrence of the reaction in the functional psychoses open for the present. This, of course, can be readily understood, if we realize the enthusiasm which his discoveries must have elicited in his own mind; but, on the other hand, it seems that the time

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(9) Jour. Amer. Med. Assn., May 30, 1914.

interval which elapsed between the serologic examination and the change in diagnosis was scarcely long enough to warrant this change.

The following is a summary of Simon's work with cases at the Sheppard and Enoch Pratt Hospital:

TABLE OF RESULTS IN 106 CASES TESTED AGAINST SEX GLAND, BASEDOW THYROID AND CORTEX.

| | No. of Cases. | Sex Gland. | Per Cent. | Basedow Thyroid. | Per Cent. | Cortex. | Per Cent. |
|---|---|---|---|---|---|---|---|
| Dementia praecox | 25 | 22‡ | 88 | 13 | 56 | 10 | 40 |
| General paresis | 11 | 0 | 0 | 4 | 36 | 5 | 45 |
| Manic-depressive insanity | 25 | 4 | 16 | 9* | 36 | 6 | 24 |
| Involutional depression | 10 | 2 | 20 | 5 | 50 | 4 | 40 |
| Constitutional psychopathic states | 4 | 2 | 50 | 4 | 100 | 4 | 100 |
| Defective mental development | 3 | 0 | 0 | 0 | 0 | 2 | 66 |
| Toxic (nephritis) cases | 2 | 2 | 100 | 0 | 0 | 1 | 50 |
| Intoxication psychosis (alcohol) | 5 | 4 | 80 | 1 | 20 | 1 | 20 |
| Traumatic psychosis | 1 | 0 | 0 | 1 | 100 | 0 | 0 |
| Organic dementia | 3 | 0 | 0 | 0 | 0 | 2 | 66 |
| Exhaustion psychosis | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Drug intoxication (morphin) | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Doubtful diagnosis | 15 | 10† | 66 | 2 | 11 | 4 | 26 |

*All of these patients were agitated, showing "Angst" symptoms.

†All of these patients showed constitutional psychopathic tendencies.

‡In three patients classed as having dementia praecox and who did not react, the disease was of several years' duration.

"To summarize, we can say that a sex-gland reaction may be obtained in nearly, if not all, cases of dementia precox at some stage of the disease, but that the reaction is not specific of dementia precox, as Fauser would have us believe. It may, of course, be debatable whether the relatively small percentage of cases in which the clinical history pointed to manic-depressive insanity, but in which a reaction was obtained nevertheless, were in reality manic-depressive cases, but the fact remains that in other types of insanity the reaction may also be obtained, even though we admit that it is observed far less constantly. Of special interest is our observation that in a large percentage of alcoholic cases a sex-gland reaction seems to be obtainable. It will be noted that no reaction was obtained in any one of the eleven cases of paresis. Our results thus seem quite in accord with those of Fauser, but just as he notes that at one time one of his associates obtained a positive reaction in an isolated case of paresis, so also did Dr. Judd in another series of mental cases note a positive reaction in a few instances. The significance of these divergent findings may of course be manifold."

"How to explain our positive findings in manic-depressive cases, I do not know. It is possible that some of these cases were really precox cases, but it is not likely that this explanation would be applicable to all our exceptions to the general rule of Fauser that in manic-depressive insanity only negative reactions are obtained. We must, hence, either conclude that Fauser's rule does have exceptions or that our positive findings were due to some error of technique."

Simon comments on the interesting observation by Lampé that in Basedow's disease a more constant and more intense reaction is obtained with Basedow thyroid than with normal thyroid, which would lead to the conclusion that in this disease we are not dealing with a hyperfunction but with a perverted function of the gland. Following up this suggestion, the author makes some instructive general remarks on the whole problem opened up by the study of protective ferments:

"In considering this question in connection with dementia praecox the thought of course suggests itself that here also we may be dealing with a perverted function of those cells which are concerned in the production of the internal secretion of the sex glands. Evidently, it would be advisable to study, on the one hand, the intensity of the ferment reaction against normal sex gland, and on the other, the reaction against sex gland derived from praecox cases. This has not as yet been done, but would seem to be the most important next step. Practically all the reactions which we obtained with testicular tissue were relatively slight, and it would accordingly go far toward establishing the existence of a perverted function of the cells furnishing an internal secretion, if it could be established that more marked reactions were obtainable with praecox than with normal organs.

"That the interstitial cells of the testicles are concerned in the reaction we could demonstrate by combining the patient's serum, on the one hand with infantile tissue, and on the other with adult testicle, when reactions of equal intensity were obtained with the two antigens.

"Supposing that the stimulus for the production of the ferments in question were to emanate from the sex glands, the next problem would be to ascertain the origin of the ferments. During his early studies of the pregnancy reaction Abderhalden believed that the ferment originated from the blood-cells, having the leukocytes more particularly in mind. Subsequently, however, he seems to have abandoned this view, and in a late publication he expresses the belief that the ferments might possibly be formed in the very organs against which their activity is directed. One reason which led to this change of view was the observation that whereas antitesticular ferments appear in the blood-serum of normal rabbits following the parenteral introduction of testicular cells, this does not occur in castrated animals. On the other hand, however, it must be remembered that the formation of antichorionic ferments may be evoked artificially both in male and female animals, so that we may conclude that whereas certain ferments may originate in the homologous organs, others may be produced by heterologous cells. This would be in perfect accord with what is known to occur in the production of tetanus antitoxin as a consequence of the introduction of the corresponding toxin.

"Even though immunization with normal sex-gland tissue should evoke the liberation of corresponding ferments in the normal organ, it would not follow that other tissues might not become similarly active if an abnormal secretion were to enter the circulation.

"Every cell of course contains proteolytic ferments which are capable of causing the digestion of homologous cells, when certain inhibitory factors fall away (for example, autolysis after death), and it would seem the simplest to assume that these ferments are given off by the cell when corresponding cells or cell-products are introduced into the circulation. But it remains to be seen whether the ferments then occurring in the blood are identical with the normal ferments of the normal cells and those occurring in the blood under manifestly pathologic conditions.

"Considering the problem from the clinical side, the all-important question of course suggests itself whether or not the reaction has any relation to the pathogenesis of dementia praecox. Theoretically, this is of course perfectly possible. Granted that antisex-gland ferments do occur in the circulation in dementia praecox, and that their presence is the outcome of the appearance in the circulation of an abnormal secretion or of abnormal cells, then we may also assume that digestion of these cells or cell-products will take place, and that all conditions would thus be given for a chronic protein intoxication which might very well expend itself on the central nervous system. Should this be true, then we might also expect that the administration of sex gland to such patients would cause an aggravation of the patient's condition, while partial or entire castration, possibly combined with the transplantation of normal organs, might similarly be expected to have a beneficial influence. Evidently, the problem is now open to investigation from many sides, and it does not seem unreasonable to expect that definite advances will be achieved in the near future."

**Another Warning Against Hasty Conclusions from the Abderhalden Tests** has been uttered by Ellison L. Ross and H. Douglas Singer,[1] who give the following brief statement of their results:

1. Paretic serum: With two washings, 10 serums all gave positive results; with three washings, 6 were all positive; with five washings, 8 of 11 were positive; with ten washings, 1 of 3 was positive; with eleven, 2 of 8; with thirteen, fourteen and fifteen washings, none of 20 was positive.

2. Normal serum: With two washings, 8 were all

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[1] (1) Paper read at 1914 meeting of Mississippi Valley Med. Soc.; reported in Jour. Amer. Med. Assn., Nov. 14, 1914, p. 1787.

positive; with three washings, 1 of 4 was positive; with five, eight, ten, eleven, thirteen, fourteen and fifteen washings, a total of 34 serums all gave negative results. It was also demonstrated that the water used for the washing of substrates contained material which underwent lysis when mixed with blood serum. Hence, in order to determine whether there is any specific difference between the ferments present in general paresis and the normal state, the water used for the fifth and eighth washings was concentrated and used as a substrate. In spite of the failure of normal serum to digest brain substrate which had been washed five times or more, normal serum caused lysis of the material in this wash-water fully as markedly as did that from cases of general paralysis. From these facts it is evident that no interpretation of the results of Abderhalden's tests with tissue substrates is justifiable unless the same (not merely similarly prepared) substrate has been proven to give negative results with a series of normal serums.

**A Discussion of the Abderhalden Tests in Mental Diseases** of great interest, on account of the prominence of the participants, took place at the annual meeting of the German Psychiatrical Society held in Strassburg in April, 1914.[2] Fauser and Kafka, while aware of the necessity for great caution, remain convinced of the usefulness of the method in the study of mental diseases, but other high authorities were extremely skeptical. Thus the prominent serologist, Plaut of Munich, states that the theoretical foundation for the method can not at all be considered certain. The results obtained in Munich with the most painstaking and perfect technique did not at all correspond with those of Fauser, but positive reactions with brain and genital glands were repeatedly obtained in cases of hysteria and manic-depressive insanity. With an experience gained in testing over 100 cases, Plaut rejects the Abderhalden tests in their present form as being of no clinical value in psychiatry, but he hopes that the undoubtedly brilliant researches of Abderhalden ultimately will lead to something useful in psychiatric diagnosis.

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(2) Proc. published in Neurolog. Centralbl., 1914, vol. 33, p. 872.

## INSANITY AND RACE.

**Mental Diseases in Negroes** have been given considerable attention this year. Thus John E. Lind[2] of the Government Hospital for the Insane at Washington writes on the "diagnostic pitfalls in the mental examination of negroes." He states that it is to the credit of the profession generally that comparatively few mentally normal persons are committed as insane, in fact, roughly speaking, ten mentally abnormal persons are allowed to be at large after being tested as to their mental condition where one mentally normal person is pronounced insane. The author recalls only a few instances of the latter class of mistakes in white people, while it has been comparatively common in the case of negroes. The main purpose of Lind's paper is to call attention to some difficulties which beset the uninitiated in the mental examination of negroes.

"We must remember that we have in dealing with the negro, especially the negro with little or no white admixture, a somewhat primitive psychologic type whose cultural levels overlook but slightly those of the savage. Superstition still hovers with bat-like wings over his emotions and casts shadows of fear about all incidents differing from his daily routine. 'Haunts,' spirits, conjurers, spells and hoodoos people his world. His theology centres about a personal Deity Who speaks to him at times, even as of old He called Samuel in the night. His psychology is that of a child, but of a child who lives in contact with a world moulded to suit the requirements of more highly developed types. It is not surprising that when an isolated individual is observed by one not familiar with the psychology and prejudices of his race, characteristics normal to the individual are sometimes mistaken for symptoms of a psychosis."

The orientation is usually first ascertained.

"It will often be found that a negro is very poorly informed about the day of the month and the year; sometimes, especially toward the end or the beginning of a month, he will give the following or the previous month instead of the correct one. The season, too, is a

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(2) New York Med. Jour., June 27, 1914.

rather indefinite division of time in his mind; he is very apt to base his answer on the state of the weather prevailing, *e. g.*, if it is a bright, balmy day in January or February, he will say it is spring; if the snow is falling in November, he will call it winter. Orientation for place and people is not so apt to be at variance, but a negro often spends from several days to several weeks in a hospital without bothering to ascertain its nomenclature accurately. A frequent question asked, "Who is President of the United States?" often brings forth the name of the last President instead of the present one, especially if the last President has chanced to have a picturesque personality. These replies to the questions concerning orientation must not then be confounded with pathological clouding of consciousness. In the fields of general memory apparently gross defects appear in nonpsychotic negroes. I have seen them, for instance, unable to recall accurately the number of their children. One negro told me he did not remember the date of his marriage, but it was 'on a Tuesday.'"

"In the emotional status, it should be noted, a negro is often described as being elated, hypomaniacal, etc., when he is exhibiting the racial freedom from worry. The negro is a child of nature, he is easily amused, easily led, and a confirmed traveler in the path of least resistance. I have frequently observed that negroes placed in an institution seem relieved that the problem of bed and board was thus happily solved; they were highly entertained by the grotesque appearance and strange conversation of the mentally afflicted inmates and remained during the course of their stay in the hospital in a state of high good humor, laughing, singing, and playing jokes continually, although mental examination failed to reveal any evidences whatsoever of a psychosis.

"It is, however, in the examination for hallucinations and delusions that the most frequent mistakes are made, as this is the most patent symptom of mental disorder to the lay mind, and even to the practitioner who does not specialize in psychiatry. We find in negroes the frequent statement that they have seen spirits, angels, ghosts, and other supernatural manifestations. We should remember here that literature abounds with stories of the supernatural, that of even highly educated persons, at least one-half believe in ghosts, if not openly and avowedly, then *hinter den Bergen*. It is not surprising that the negro, stocked as he is with the rich supply of traditions pertaining to haunts, night doctors, hags, and hoodoo men, which every old negro uncle has at his command, should mistake things in dark and mysterious places for beings from another world, or that he should attribute persistent bad luck or ill health to evil influences of diabolical origin.

"The most common error of all, perhaps, in dealing with the negro, is to accept at its face value the statement that he has seen and talked with the Lord. Strict investigation should be made of this statement before it is accepted as an hallucinatory experience and usually the subject of inquiry will qualify it later by saying he meant 'with the eye of faith,' or 'the ear of faith.' The tendency is found oftener in old negroes who are of a pious turn of mind, and, having done with the follies of this world, begin to anticipate the glories of another, although it will be often found, too, in the younger negroes."

The author relates how negroes arriving in Washington from country districts often fall into the hands of the police on account of some absurd inquiry or the statement that they have "come to see the President." Frequently they have been sent to the insane hospital on account of a statement that someone has "tried to put a spell" on them or "hoodoo" them.

"To sum up, then, it might be said that there are two things to be kept in mind especially. in the mental examination of the negro, one is, not to jump to conclusions, the other is, not to take what he says at its face value. Examine each statement carefully to see whether he actually means it as he says it or not. Remember that his vocabulary is limited, that he does not speak your language. After you have decided that he actually does mean the statement as it is given, consider whether or not it is in accord with his psychology, his superstition, his prejudices, and his theology, in short, if it is what you would expect of a person whose great grandfather was perhaps a cannibal; and finally remember that, if after you have made a careful mental examination of a negro, and there is a doubt in your mind as to whether he is crazy or not, he probably is not."

Mary O'Malley,[4] also of the Government Hospital for the Insane, contributes a paper on the psychoses in the colored race chiefly based on statistics concerning 455 white and 345 colored female patients of the government hospital. The following conclusions are reached:

1. As to the facts brought out, the tables show the conclusion is warranted that in the colored race a large increase of mental disorder is obvious since their attainment of freedom, and that, too, in localities favorable to the race.

2. The mental mechanism in the given psychoses does not essentially differ in the two races.

3. The dementia precox type is the preponderant mental disease entity among the colored, but it is not excessively disproportionate to the same manifestation in the whites; there is an excess of the hebephrenic type in both races; the number of catatonics in the colored exceeds the number in the whites and there are more of the paranoid type in the whites than in the colored.

4. Manic-depressive psychosis is not so prevalent among the colored as in the whites, and in the colored the excited phase of this psychosis is more frequently observed, while the depressive types are not common.

5. Involutional melancholia and depressions of various forms are rare in the colored as these individuals do not react to the graver emotions—grief, remorse, etc.—owing to the fact that they have no strict moral standard and no scrupulosity as to social conventions; the absence of self-depreciatory ideas of sin, etc., is most noticeable.

6. The prevalence of syphilis in the colored race has had a marked influence on certain types of mental disorder, as general paresis, cerebral syphilis and other luetic infections, and these are very much in excess of the same diseases in the whites.

7. While the colored race indulge in and imbibe large quantities of alcohol, they are in a degree immune to its influence and the reaction to its toxic effects is less lasting.

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(4) Amer. Jour. Insanity, October, 1914.

8. Paranoid conditions are present but true paranoia is rare, especially among the colored women.

9. Hysteria is a disease which is rare in the colored.

E. M. Green,[5] clinical director of the Georgia State Sanitarium at Milledgeville, has made a similar study based on the admissions during five years, namely, 3,291 white people and 2,119 negroes. On the basis of these statistics the author considers the psychoses under three groups:

Group 1. Psychoses occurring with equal frequency in both races: Here we have infective exhaustive psychoses and allied states, traumatic psychoses and psychoses accompanying epilepsy, pellagra and brain tumor.

Group 2. Psychoses appearing more frequently in the white race: Chief among these are alcoholic and drug psychoses, involution melancholia, paranoic conditions, imbecility and idiocy.

Group 3. Psychoses appearing more frequently in the negro race: This group is composed of senile insanity, paretic dementia, dementia precox and manic-depressive insanity. It is of particular interest that both in the Georgia and Washington cases paretic dementia is found to be relatively more frequent in the negroes, as formerly the opposite view was held. Green believes that the error was due to the frequent failure to recognize the disease when unaccompanied by the expansive ideas which were formerly looked upon as characteristic of it. In the negro paretic the simple dementive form is more frequent than the better-known expansive form. That paretic dementia should be more frequent in the negro is of course readily explained by the greater frequency of syphilis in that race.

The following tabulation shows the percentage of paretic dementia in the two races and sexes, based upon their respective admissions during the 5 year period:

| | Per cent. |
|---|---|
| White males | 4.5 |
| White females | 1.2 |
| Negro males | 10.2 |
| Negro females | 4.2 |

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(5) Jour. Nerv. and Ment. Dis., November, 1914.

**Dementia Precox in the Colored Race.** This is given special attention by Arrah B. Evarts[6] of the Government Hospital for the Insane at Washington, who begins with an interesting account of the race history of the negroes and their mental traits as seen in Africa. The author is not surprised that insanity in general and dementia precox in particular should be on the increase in the colored race. Speaking of slavery and the hardships to the race caused by the unaccustomed demand on them for persistent work he writes: "Hard as this was in the beginning, the bondage in reality was a wonderful aid to the colored man. The necessity for mental initiative was never his and his racial characteristic of imitation carried him far on the road. But after he became a free man the conditions under which he must continue his upward progress became infinitely harder. He must now think for himself and exercise forethought if he and his family are to live at all; two things which had so far not been demanded and for which there was no racial preparation.

"We are beginning to think of insanity as a failure on the part of the individual to adjust to the demands of his environment. In the upward spring of any race it is inevitable that many individuals will fall because of their inability to change with changing conditions. With this in mind, we can understand why insanity should be on the increase in the colored race for of it is being demanded an adjustment much harder to make when we consider the factors to be used in the problem than another race has yet been called upon to attempt."

The author states that dementia precox is essentially a deteriorating psychosis, protean in its manifestations and, as the colored patient already lives on a plane much lower than his white neighbor, actual deterioration in the individual must be differentiated from the supposed loss of a racial period he has not yet attained.

Dementia precox in the colored race differs in no essential from the well-known picture seen in white people. The two great exciting causes, worry and emotional shock, are found repeatedly. The three chief forms of the disease, the hebephrenic, the catatonic and para-

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(6) Psycho-analytic Rev., October, 1914.

noid, occur in colored people in frequency in the order named, as in white people. Hallucinations are common and are often given a most primitive interpretation. The patient sees ghosts and hears them talk. He has been conjured or someone has wished a spell on him. Sexual perversions are much less frequent than in white patients and, according to the author, for the reasons that negroes usually fully satisfy their sexual desires with no feeling of having done wrong. For the same reason, they seldom have recourse to symbolism in this sphere and "buried complexes" do not seem to exist. Even their dreams are frankly wish fulfilling and as frankly described.

**The Dreams of the Negro** have been systematically studied by John E. Lind,[7] who obtained the dreams of 100 negroes, selecting only those who were considered full blooded. Eighty-four of the hundred dreams were frank expressions of wish fulfilment, the other sixteen were more complex. Of the eighty-four, fifty-two contained the brief expression of a single idea, while the other thirty-two presented the wish more in detail. The most frequent dreams were: "I dreamed that I was out" in the case of negroes who were in jail when examined; or, "I dreamed that I was going to get my pension"; or, "I dreamed that I had fifty or sixty dollars." The dreams of insane negroes were also generally of the same simple type. Altogether, these observations corroborate Freud's view that the dreams of individuals of primitive mental processes represent the frank expression of a wish fulfilment.

**The "Color Complex" in the Negro.** This has also been studied by John E. Lind.[8] It is not surprising that the consciousness of being considered an inferior race should be responsible for the existence of a "color complex" even in negroes presenting no evidence of a psychosis. In the somewhat primitive theologic conception which obtains among the negroes God is personified as a white man and the angels also are white. According to their ideas, the future blessed state is one in which they will display a spotless integument, and the first ceremony in their entrance to Heaven is the casting aside

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(7) Psycho-analytic Rev., July, 1914.
(8) Psycho-analytic Rev., October, 1914.

of the ebony husk. Coming back to the subject of dreams, Lind states that frequently there will be presented a dream picture like the following: "I saw my girl and she was white and talking to a lot of white people"; or the dreamer finds himself in the company of white women or men who treat him as an equal.

In psychoses in negroes the character of the delusions largely depends on this "color complex." Attention is called to the views of Adler, who allots a less important part in the etiology of mental disturbances to the sexual factor than does Freud. He discusses at length the conflict in the life of the individual with the "will to power" of Neitzsche and holds that this, with a sense of inferiority, is at the bottom of a large proportion of disturbances in the individual psychic life. According to Lind, this sense of inferiority is concretely represented in the negro by his color and when he has failed to adapt himself to reality it is not surprising that he compensates himself by the creation of a new order of things: he makes himself white, his seeming dark hue is due to a disguise which he has adopted for one purpose or another or it has been acquired accidentally. By the simple conversion of his outer skin into another color he symbolizes his identification with the, to him, superior white race. He is then on a par with the more favored beings and as such has adjusted himself with the world. Numerous cases are cited. Thus, a senile dement said that he was white and that all his relatives were white. He said his dark color had been caused by dye placed in the water in which he washed. A paranoid dement claimed that he descended from an Ethiopian prince who at one time conquered and ruled over Egypt and he said that the ancient Ethiopians came from Asia and were not black. A hebephrenic patient, very much deteriorated, spent hours of every day washing his face and hands and muttering, "get paint off." A paranoid woman said that she was white and that the present color of her skin was caused by the eating of dark colored food.

Lind reports in detail the case of a male negro who had been given a life sentence for murder. He developed a psychosis and in the course of time developed an elaborate system of delusions by which he compensated himself for reality. There were three chief points: first, he is not a murderer because his victim is still alive; second, he is not in prison for murder because he himself built and owns the prison; third, he is not a negro in prison for murder because he is a white man disguised as a negro. Finally, this patient has just developed a fourth method of compensation: the whole thing is a case of mistaken identity due to the fact that there is a town in Louisiana called Washington which the patient built and where he is a prominent citizen. Through some mischance he has been confused with another man of the same name, a poor Washington negro who has committed a murder. If his townspeople in Washington, Louisiana, can be notified the error will be righted.

**Paretic Dementia in the Negro.** Francis M. Barnes[9] finds that paretic dementia at the present time occurs with greater frequency among the colored people of the United States than among the whites. Among the women this disease is three times as frequent as in women of the white race. Barnes finds that the simple dementing type predominate over the expansive form and that there is a marked tendency to hallucinations revealing a fondness for mysticism.

**Insanity Among Jews. Is the Jew Disportionately Insane?** A paper with this title read before the New York Neurological Society by A. A. Brill and M. J. Karpas;[1] the paper was read by Dr. Brill.

The authors stated that ever since modern psychiatry came into existence, it has been understood that the Jew contributes more to insanity than any other race. As far as they could ascertain, however, very few investigations have been made along this line, yet when they consulted the works of such eminent observers as Kraepelin, Krafft-Ebing, Weygandt, Arndt and others they found that they all agreed that the Jewish race is disproportionately afflicted with insanity. However, the opinions expressed by these and many other authors are not fully shared by other investigators. Thus, Sioli states: "All nervous and mental diseases familiar to us occur among all nations of the earth, but we are unable as yet to draw

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(9) New York Med. Jour., October 18, 1913.
(1) Jour. Nerv. and Ment. Dis., 1914, vol. 41, p. 512.

any definite conclusions concerning the frequencies and most manifold appearances of the same." Sichel carries this disagreement still farther, basing his opinion on the record of the Frankfurt Hospital, which shows about the same relative percentage of mental diseases among Jewish and non-Jewish admissions. He also found that the Jews contribute a very small percentage to the alcoholic psychoses.

From the figures available in literature, the authors state, one can readily see that the sweeping statement made by so many that the Jew is disproportionately afflicted with insanity has never been confirmed by careful statistical data. All that one can say from the material at hand is that the Jewish, like any other race, contribute a higher quota to certain forms of mental diseases. With the object of throwing some light on this question, the authors examined the statistical data of the admissions to the Manhattan State Hospital for the four consecutive years, beginning Oct. 1, 1908, and ending Sept. 30, 1912. The total number of admissions was 5,710 (2,803 men and 2,907 women), of which there were 1,203 Jews (588 men and 615 women). The Jews thus constituted 21 per cent. of the total admissions.

From a careful study of the diagnostic grouping of the Jewish patients, one could readily see that the predominating psychoses among them were of the functional type. Thus, the highest percentage was found in the manic-depressive group, and second in order was the undifferentiated depressions, the greatest majority of which belonged to the manic-depressive class, and third in order was the dementia praecox group. The relatively high percentage of the imbecility and constitutional inferiority groups might be explained by the fact that these diagnoses were only too often made when a foreign Jew was examined by a physician who was unfamiliar with his language and racial characteristics.

The relatively high percentage of the infective exhaustive groups in men may be partially attributed to the poor hygienic conditions at home and in sweat-shops.

It was interesting to note that the general paresis group showed a comparatively high percentage. This condition was also found by Hirschl, Pilcz, Benedikt, Beadle, and others whose material came from large cities. The Russians, however, found a very low percentage of general paresis among Jews. The explanation lay in the fact that in Russia the orthodox Jews were in the majority, and owing to their rigid religious tenets and early marriages they led a pure sexual life. The senile and epileptic insanities and psychoses accompanying organic brain diseases showed a relatively low figure, and the alcoholic psychoses represented only 2.5 per cent of the male alcoholics: there were none among the female admissions. This concurred with the results found by all investigators on the subject.

The authors stated that in order to correlate their data, they obtained an official estimate of the population for the boroughs of Manhattan and Bronx, as given by the New York Board of Health for the year 1909 to 1912, inclusive, and compared the same with the total insane population of the psychopathic pavilion of Bellevue Hospital for the corresponding years. It was noted that the insane admissions to Bellevue were drawn from these two boroughs.

By the courtesy of the Federation of Churches they obtained the number of Jews for the two boroughs for the year 1910, and by taking the average of the total population for the four years and subtracting the number of Jews they found the following results:

| | |
|---|---|
| **Average total population for the boroughs of Manhattan and the Bronx for one year (from 1909 to 1912, inclusive)** | **2,829,243** |
| **Jewish population for 1910, or about 29 per cent. of the total population** | **807,801** |
| **Non-Jewish population for one year** | **2,021,442** |

The insane population for four years, as taken from the records of Bellevue Hospital, was as follows:

| | | |
|---|---|---|
| **Non-Jews** | **10,766;** | **average, 2,691 per year.** |
| **Jews** | **3,062;** | **average, 765.5 per year.** |

The relative percentage of the insane population was 0.0013 for non-Jews, and 0.0009 for Jews, or about thirteen insane for every 10,000 non-Jews, and nine insane for every 10,000 Jews, or one to 751 non-Jews, and one to 1,053 Jews.

In brief, after thoroughly investigating the literature on the subject, the authors were forced to the conclusion that the prevailing belief that the Jews contribute more to insanity than any other race has never been substantiated by detailed statistical data. With the exception of a few investigators, notably Sichel, Kirby and Pilcz, no real effort has been made to settle this question. Their own findings, based on four years' statistics from the two biggest boroughs of the largest Jewish city in the world, show that the Jews are not disproportionately insane. They agreed, however, with those writers who claim that the Jewish race contributes a rather high percentage to the so-called functional forms of insanity. In that respect, however, the Jew does not differ from other races, as there seems to be a certain selectiveness, even in abnormal reactions, which shows itself in definite forms of insanity. Why the Jew should show a preference for those particular psychoses would form the thesis for future investigation.

Dr. George H. Kirby said the paper of Dr. Brill and Dr. Karpas was of special interest to him, as they had for several years past endeavored to collect careful statistics at Ward's Island regarding the different racial types coming into the hospital. Similar data are now being gathered under the supervision of the State Hospital Commission in all the state hospitals.

Studies in comparative race psychopathology have always seemed to him important, not only because of their purely psychiatric value, but also because of their practical bearing on some sociologic and economic problems. It is, for example, important to know that the Italians are bringing in more epilepsy than any other race; that the Irish supply an enormously disproportionate number of alcoholic psychoses, and that the recently arrived Jews furnish a high percentage of dementia praecox, manic-depressive insanity and feeblemindedness. While the studies so far made show that these psychopathic tendencies exist in varying degree among the different alien groups, it is much more difficult to determine if insanity in general is more prevalent in one race of mankind than another. Dr. Brill and Dr. Karpas, contrary to certain general impressions, have concluded that insanity is *not* disproportionately frequent among Jews as a race, but that in fact just the opposite is true. Dr. Kirby said he wished to mention one factor involved in this study which he thought threw some doubt on the conclusions reached. To determine the incidence of insanity, one should not compare an essentially immigrant population (such as the Jews in New York) with the native-born population. An immigrant population may be variously constituted. It usually contains a disproportionate number of young adults, and the two sexes may exist in unusual proportions. The Italian population of New York has a big majority of young, unmarried men, while the Irish immigration has brought more women than men to this country. On the other hand, the native-born population contains from one-sixth to one-fifth of children, and has, of course, a much larger proportion of middle-aged and old people than does an immigrant population. The age periods are, therefore, very important in determining the incidence of insanity in any group of people. One reason why dementia praecox and manic-depressive insanity are relatively more frequent among Jews admitted to the hospitals than among the native-born is because there are relatively more young adults in the Jew population. As the average age of the immigrant population increases, there will be more cases of paresis and, later still, more cases of arteriosclerosis and senile dementia to record among the Jews.

Dr. Kirby said that in his opinion, more reliable comparisons are those contained in the figures which the authors of the paper quoted from the Russian sociologic study. We have there a native Russian population compared to a native Jew population, and the figures are practically equal, the Jews showing only a slightly higher percentage than the Russians. If, however, the multitude of cases of dementia praecox and manic-depressive insanity among the Jews in this country had remained in Russia to be included, the percentage probably would have been even higher for the Jews.

In regard to feeblemindedness, a great deal of the data available indicate that it is proportionately higher among

Hebrews than other races. Among all the cases of imbecility admitted to the Manhattan State Hospital during the past four years, 50 per cent. were Jews, whereas this race constitutes only 21 per cent. of the total admissions. Some studies made in the New York City schools showed a high percentage of Hebrew pupils in the classes for defectives. With 10 per cent. of the children of native parentage, there were 40 per cent. of Hebrew parentage: more Hebrew children, in fact, than there were Italian, German, Irish or negro children combined. At Ellis Island, the number of defective Hebrews excluded has been remarked on; figures show that nearly 33 per cent. of all the immigrants certified as mentally defective are Hebrews, whereas this race furnishes only 14 per cent. of the total arrivals.

Dr. Smith Ely Jelliffe said the general attitude toward any statistical problem is one that is extremely difficult to grasp. Statisticians who follow work of this kind as a profession seem to feel that the average question can be satisfactorily and definitely solved by figures, and they are apt to ignore certain facts tending to show that such figures, taken by themselves, are of rather superficial importance. Sociologic and economic questions, the transplantation of families, educational factors—all these must be taken into consideration in trying to solve this problem of the comparative prevalence of insanity among the Jews or other race.

Dr. Morris J. Karpas stated that the statistical data in the paper were obtained from the Manhattan State Hospital and the psychopathic department of Bellevue Hospital; the former aided them in the study of various forms of mental diseases occurring in the Hebrew and the type of predilection of certain forms of mental diseases; the statistics from the latter prove that the ratio of the Jewish insane to the Jewish sane population is not so high, and since Jews inhabit large cities, New York formed an invaluable source of information for the study of race psychopathology, particularly in Jews. The figures are by no means absolute; but they form an invaluable index by which one can gauge the insane population and furthermore be guided in future studies along the same lines. He feels that the large number of so-called mental defectives among Hebrews excluded at Ellis Island are not at all conclusive, inasmuch as the medical examiners there are not familiar with the language and racial characteristics of the class of immigrants they are dealing with. One must bear in mind that feeblemindedness, excluding the well-defined cases of idiocy and imbecility, is purely relative, and before one can diagnose a case of mental retardation, it is necessary to take into consideration the individual in relation to his heredity, environment and intellectual training.

Dr. Brill said he realized that the criticisms made by Dr. Kirby and Dr. Jelliffe had some basis, but when one came to investigate the statistics that had been given by various other writers to prove the converse of this contention, namely, that the Jews do contribute more to insanity than any other race, one would find that their deductions were based largely on hearsay, while the conclusions drawn concerning the number of insane Jews in Manhattan and Bronx were based on actual figures. In this paper, Dr. Brill said, they had confined themselves to the question if disproportionate insanity among Jews, and had not taken up the various psychoses, as such; feeblemindedness without insanity was not considered at all, as that class of cases will be investigated and reported at some future date. It was practically impossible, of course, in a study of this kind, to select the cases from the general population at various ages, or to learn how recent or remote their arrival in this city had been. While such a selection might have had some influence on the results, it would probably have been comparaticely trifling, and the percentages would have remained practically unchanged.

Dr. Maurice Fishberg said that great care must be taken in interpreting the statistics of insanity—in fact, more discretion was necessary than in interpreting dreams. Ninety-five per cent. of Jews are city dwellers, as against only 33 per cent. of non-Jews. Urban dwellers have a higher incidence of insanity, and must commit their mental defectives to institutions, whereas in rural populations the rates of insanity are lower and sufferers from the milder forms of mental alienation are permitted to roam about. The Jews are engaged in financial and commercial pursuits in much larger numbers than the Christians, and this has an influence in the direction of increasing the number of insane among them. It is, however, impossible to determine the exact proportion of insane Jews in New York, because we have no reliable data as to the actual number of Jews, all the so-called estimates being merely guesswork.

As to the statement that 40 per cent. of the pupils in the ungraded classes in the schools of the city are of Jewish descent, the speaker said this does not at all prove that there is more feeblemindedness among them than among others. Jewish parents are more apt to send their children to school, while other immigrants often use every possible effort to evade the compulsory education law.

Dr. Fishberg emphasized the fact that while studying these problems, one must be extremely careful in the compilation of statistics. While preparing a monograph on the ethnic characteristics of the Jews he has carefully scanned the literature, which is more extensive than the readers of the paper seemed to be aware, but he could arrive at no positive conclusions. In the official statistics of Austria, Hungary, Germany and some other European countries there is much data about conditions extending over long periods of years, yet it seems that the question whether insanity among the Jews is more frequent than among others, and whether there is such a thing as *psychoses judaica,* or whether certain forms of mental alienation are more apt to occur among them than among non-Jews, has not been settled. It all depends, it appears, on the frequency of the factors instrumental in the etiology of insanity—alcoholism, syphilis, precarious occupations such as banking, mercantile pursuits, etc. That there are no race factors at work is evident from many peculiarities, and this is best illustrated by the frequency of suicide among them. Half a century ago, a Jewish suicide was extremely rare, while at present there are more Jews who voluntarily end their life in Germany and also in New York than others. Ethnic traits do not change within one or two generations.

Dr. Fishberg showed that the statistics from Russia quoted by the reader of the paper were of no value, because census statistics had never been taken seriously in that country; and, in addition, the Jews there keep their insane at home, except in very severe cases, and hence they are not counted in the asylum population. The figures presented by Dr. Brill about conditions in New York are not carefully compiled, and might be interpreted in many ways. Mere figures are of no value: statistics are always comparative.

**Insanity in China.** This is discussed by Alfred C. Reed,[2] who largely bases his statements on reports from the John G. Kerr Hospital for the Insane at Canton.[3] The following remarks are of especial interest:

"The conclusion is reached that insanity is as common, if not in fact more common in South China than in the west. One strong contributory factor to this condition of affairs, is the custom of ancestor worship which demands that every male must have off-spring. Even demented persons are at times taken out of hospital that they may marry and beget children. Naturally this results in a greater increase of mental disease among the wealthier and better classes than among the poor who often can not afford to marry.

"Three facts deserve special mention in a consideration of the prevalence and varieties of mental disease in China. Both are substantiated by the witness of many observers. The first is the absence to a great degree of alcoholism as a common vice except in the coast-wise cities. This largely removes the influence of alcohol as a hereditary factor in the development of mental disease, and in the production of mental defectiveness. At the great festival of the Chinese New Year, over-indulgence in alcoholic beverages is more common as it is also on other gala occasions. But as a chronic common vice, it has nothing like the prevalence found in western countries. The second fact is the frequency of syphilis in the primary, secondary and tertiary stages and the extreme infrequency of para-syphilitic conditions. It is a matter of clinical observation that arteriosclerosis and thickening of the arteries is excessively common.

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(2) Boston Med. and Surg. Jour., April 9, 1914.

(3) Details reported by J. Allen Hoffman, China Med. Jour., November, 1913.

Aneurysm, however, is rarely seen. Hemiplegia from embolism or thrombosis is frequent while tabes and paralytic dementia are quite unusual.

"The third fact of special interest is that while conditions of heredity, opiumism and alcoholism, the latter chiefly in the coast cities, favor the development and increase of mental disease and defect, and while these diseases are probably as frequent in China as in America, nevertheless the lack of the stress and strain of life in America makes the results of such disease in many cases far less serious than the results of similar conditions in America. It is easier for the weakened mentality to take care of itself and be independent in China because of the machine-like routine of the ordinary life of the people and their freedom from exciting and disconcerting agencies of various sorts which in other countries are all too common. It must be noted, too, that there is more than a little truth in the often made observation that the Chinese differ in their nervous make-up from Occidental races. They often seem indeed to be devoid of nerves and utterly unaffected by and oblivious to, many things which a western man finds not only irritating but really unbearable. This placid disregard for things we usually associate with 'nerves' must have a more or less important bearing on the development of latent causes of insanity. At present it is impossible to estimate this influence, but it is very real and ought to be an able adjunct if properly used, for the prevention of functional insanities whose outbreak depends on some exciting cause in the immediate environment of the patient."

## DEMENTIA PRAECOX.

**Dementia Praecox, Paraphrenia and Paranoia.** A review of the latest conception of the distinguishing features of, and demarcation between, these groups of Kraepelin is given by George H. Kirby.[4] Twenty years have now elapsed since Kraepelin first delimited the group "dementia praecox." While this term is now used everywhere, it still stands for a very imperfectly circumscribed clinical group and this is recognized by no one

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(4) Amer. Jour. Insanity, October, 1914.

more than by Kraepelin himself. The evolution of his views is best expressed in the eight editions of his textbook, in the latest of which the whole subject matter of dementia praecox and allied disorders has been rearranged. He has not materially changed his views as to the general symptomatology and the nature of dementia praecox, but, on the basis of an ever increasing material, he has established no less than eight sub-types. Kraepelin looks on all of the varied pictures of dementia praecox as manifestations of an underlying disease. He thinks of it as an entity, a special disease process, just as one looks on general paralysis as a circumscribed disease entity. He conceives of it as arising from causes originating within the body; probably some glandular activity is disturbed or some toxine is elaborated which damages the nervous tissue. He discusses the question as to whether dementia praecox can be looked on as a constitutional psychosis dependent perhaps on a degenerate family stock. He points out that heredity does not appear to be more frequent in dementia praecox than in certain other psychoses, and that the best known constitutional disorders, such as hysteria, manic-depressive insanity and psychopathic states do not lead to a deterioration but to a periodic recurrence of symptoms. He believes that dementia praecox is more comparable to epilepsy. In both epilepsy and dementia praecox we have certain peculiarities of disposition, yet we can only explain the deterioration by assuming that we have to do in both cases with progressive destructive disease processes which apparently most often begin back in childhood or early adolescence.

Kraepelin also frequently has observed the "shut-in" personality and other peculiarities of mental make-up before the onset of definite mental symptoms, but he is inclined to the view that these so-called peculiarities of make-up are the earliest signs of the disease itself rather than the expression of some general harmful influence which lowers the resistance and prepares the soil for the subsequent psychosis. When individuals show these traits in their make-up but fail to develop a definite psychosis, we have to think of a dementia praecox which for some reason failed to develop further. These undeveloped cases correspond to Bleuler's latent schizophrenia. [See Practical Medicine Series, 1913, vol. 10, p. 214.]

*Paraphrenia.* This new group is composed of cases part of which were formerly classed under dementia praecox (paranoid form) and a part under paranoia. It comprises those chronic delusional states which do not show the deterioration in conduct, the odd behavior or the emotional indifference of the ordinary dementia praecox case. Four sub-forms are described: paraphrenia systematica, p. expansiva, p. confabulans and p. fantastica.

*Paranoia.* This term is now applied only to a very small group of cases. Kraepelin does not look on it as the result of a disease process of toxic origin like dementia praecox and paraphrenia but as the reaction of an abnormally constituted personality to the struggle of life.

The paranoic character forms the foundation for the psychosis. These personalities show a great over-valuation of self, combined with suspiciousness. The psychosis is characterized by an extremely gradual development of an intellectually produced and unassailable delusion with complete retention of the integrity of the personality. Hallucinations do not appear and there is none of the disturbance of conduct, of will or of emotion as occurs in dementia praecox. The clinical picture carries above all the stamp of a delusion of greatness which crops up apparently after all kinds of internal conflicts and turmoil and represents the fulfillment of the secret wishes and day dreams of the individual.

Most of these individuals are able to get along in society and their commitment is usually not necessary. They may be known as reformers, discoverers, statesmen, founders of new religions, philosophers, etc.

Of particular interest is the fact that Kraepelin thus brings paranoia definitely into the group of psychogenic disorders.

**Somatic Disturbances in Dementia Praecox.** Kurt Goldstein and Frieda Reichmann(5) examined a large number of cases of dementia praecox in E. Meyer's clinic at Königsberg, particularly along the following lines.

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(5) Neurolog. Centralbl., March 16, 1914.

1. *The blood findings.* In catatonic cases there was usually diminution in leukocytes with a count from 4,800 to 5,500; in old and severe cases the counts would run from 3,000 down to 1,500. The red cell count, on the other hand, was usually higher than normal (from 6,875,000 to 7,550,000). The differential leukocyte count quite constantly showed relative increase in mononuclear cells, especially in the severe cases with marked leukopenia. The percentage of eosinophiles was usually very low. from 1.9 to 0.39 per cent. In the hebephrenic the leukocyte count was usually normal, except during periods of excitement when the leukocyte count would go up to 12,800 or even to 15,000, the increase being mainly in the polymorphonuclear cells. The red cell count was also high in the hebephrenics except at the excited periods when it was found decidedly reduced (3,550,000 to 2,275,000). The percentage of hemoglobin and the blood-pressure gave normal averages in both groups and the blood-pressure was not influenced by stuporous or excited states. The conclusion is drawn that the blood-picture must be utilized with the greatest care in the diagnosis of dementia praecox as tendency to lymphocytosis in itself is not characteristic of this disease. It is also found in a large series of nervous and mental diseases including manic-depressive insanity though not so marked in the latter condition as in dementia praecox. However, the blood findings are in favor of dementia praecox when we are in the presence of low leukocyte count with relative increase in lymphocytes and a high red count and when periods of excitement lead to increase in leukocytes and reduction of red cells.

2. *Vasomotor and Sympathetic phenomena.* The pulse rate in catatonia was usually low (from 80 to 60) and the pulse was almost always very soft and compressible. In hebephrenia the rate and volume of the pulse were usually normal but in both groups there is marked lability of the pulse rate which in a severe catatonic may vary from 58 in the recumbent position to 80 in the sitting and 112 in the standing position. Aschner's sign, compressibility and slowing of the pulse by pressure in the eyeballs, was frequent in catatonia; rarer in hebephrenia. Plesch's sign was sometimes observed: the radial artery which

would appear hypertonic in the resting position, became soft when the arm was raised to the vertical position. A tendency to lividity, coolness and moisture of the extremities must be looked on as signs of vasomotor disturbance. Disturbance of the light reaction of the pupils was frequently observed in both groups, particularly in catatonia.

3. *The effect of adrenaline and pilocarpine.* On subcutaneous injection of minimal doses which in normal persons causes no reaction, some of the patients showed more or less marked hypersusceptibility for one or both of these drugs. After adrenaline injections clinical symptoms such as rise of temperature and acceleration of the pulse were only rarely observed, but examination of blood secured twenty-five minutes after injection compared with that secured five minutes before injection showed increase in leukocytes, particularly of the lymphocytes.

The following observation is an example:

| | Total leukocytes. | Polymorphonuclears. | | Lymphocytes. | |
|---|---|---|---|---|---|
| | | Number | Per cent. | Number. | Per cent. |
| Before inject.. | 7200 | 3478 | 48.3 | 3094 | 42.97 |
| After inject... | 22400 | 7399 | 37.94 | 13216 | 59. |

It is noteworthy that with this effect on the blood-picture there is no increase in blood-pressure.

Absolute and relative increase in lymphocytes was also seen after pilocarpine injections. Patients with severe catatonia also frequently exhibited the symptoms which occur in the normal person only after large doses, such as salivation, sweats and redness of the skin of the face and chest.

4. *General examination of the nervous system.* This usually revealed increased tendon reflexes and normal reflexes in the mucous membranes, in most cases marked dermographia, often "ovarie," an increase in the mechanical excitability of the muscles. On tapping the ball of the thumb and the edge of the tongue, depressions would form.

5. *Electric excitability.* The electric irritability of the median nerve was tested in numerous dementia praecox cases as well as in normal subjects. The former

showed a nearly constant anodal hyperexcitability. A similar condition was never seen in manic-depressive insanity, but was present in a few severe cases of hysteria and in a few epileptics.

In their *résumé* the authors consider the demonstration of anodal hyperexcitability in dementia praecox as the most constant and valuable diagnostic sign discovered by them, a sign otherwise characteristic of spasmophilia. Its presence in dementia praecox points to existence of parathyroid disturbance which is further indicated by the frequency of other signs of tetany. Of special value in the diagnosis between dementia praecox and manic-depressive insanity is the above described susceptibility to minute doses of adrenaline and pilocarpine in the former disease.

**The Coagulation Time of the Blood in Catatonia.** Hauptmann[6] found increased rapidity of coagulation in catatonia which, judging from investigations in exophthalmic goiter and other thyroid diseases, indicates diminished thyroid activity, a condition the presence of which in dementia praecox is also rendered probable on account of the positive Abderhalden tests with thyroid. The findings also harmonize with the experience gained in the study of thyroidectomized animals and in human myxedema. Furthermore, these findings indicate the advisability of persistent thyroid treatment in dementia praecox.

## MISCELLANEOUS PSYCHOSES.

**The Mental Disturbances Following Acute Articular Rheumatism.** According to A. Knauer[7] these disturbances may be divided into two principal groups. First there are the cases coming on at the height of the acute illness and usually during a period of high fever, so-called cerebral rheumatism. The patient suddenly develops a state of great fear and delirium, tries to jump out of the window and is violent. Vomiting, convulsions and slowness of the pulse set in and finally, frequently coma and death. Hyperpyrexia may occur. In the second group the mental symptoms appear during

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(6) Neurolog. Centralbl., July 1, 1914, p. 869.

(7) Zeitschr. f. d. gesamte. Neurol. u. Psychiat., 1914, vol. 21, p. 491.

convalescence and are unattended by fever. The most characteristic mental picture is that of a state of melancholia with stupor. Other cases show alternating stupor and a noisy, confused state. Choreic movements frequently occur. The frequency of these psychoses is not great, in Munich not more than one in a thousand rheumatic cases. The author has collected eighty-one cases from the literature and adds eleven new ones. The mortality is only about 5 per cent. and the good prognosis is further emphasized by the fact that no patient required more than one year for recovery. In a small number of cases the duration was less than two weeks, but in 80 per cent. it averaged between three and four months. The author believes that this complication was more frequent in former times when alcohol was given more freely to fever patients.

**Clinical and Anatomic Analysis of Twenty-five Cases of Mental Disease Arising in the Fifth Decade, with Remarks on the Melancholia Question and Further Observations on the Distribution of Cortical Pigments.** This is the title of an interesting contribution by E. E. Southard and Earl D. Bond.[8] The scope and results of their study may be gleaned from their summary and conclusions:

1. We have reviewed a group of twenty-five cases of mental disease (Danvers State Hospital material), so selected as to offer a fair sample of mental diseases arising in the fifth decade of life.

2. Our principle of selection excluded all cases which were obviously *not* characteristic of the fifth decade (paresis, alcoholic mental disease, and the like); the group of non-characteristic cases thus excluded was extremely large (approaching 80 per cent. of all cases arising in the decade) and the preventable diseases alone amounted to over 60 per cent.

3. We remained with a group of twenty-five cases (ten males and fifteen females) which present certain common aspects. These cases may be *negatively* defined as *not* due to syphilis, alcohol, cerebral arteriosclerosis, brain atrophy, or other factors yielding coarse brain disorder; as not possessing pronounced schizophrenic fea-

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(8) Amer. Jour. Insanity, April, 1914.

tures; as not uniform in course or outcome; as not likely to show either elation or expansive delusions. They may be positively defined as almost, if not quite, constantly subject to delusions at some stage in each case; as yielding manic-depressive traits in the large majority of cases; as prone to depressive features; as possessing a strong hereditary taint (74 per cent. of properly studied cases); as not infrequently suggesting disorder of glands of internal secretion.

4. The delusional features, present in all cases (save one of myxedema), were not characteristically of any particular form; the delusions were somatic in fourteen cases; dealt with various alterations of personality in fourteen cases (combined with somatic delusions in eight instances); and (superficially at least) dealt with the social environment in thirteen cases (six times combined with other forms).

5. As to somatic delusions, it is further of note that a physical basis could be recognized for many of them in diseases of the viscera; and that, on the whole, these visceral counterparts of the delusions were more serious than the patients' complaints themselves.

6. Delusions of negation (five instances) and of unreality (four cases) do not bulk so large statistically as they are apt to in descriptions of so-called involution-melancholia.

7. The group, taken as a whole, is far more suggestive of manic-depressive insanity than of dementia praecox or of any other form of mental disease.

8. On the whole, depression is the most common manic-depressive feature of these cases; but the constant occurrence of various delusions alongside the depressive emotions makes the latter seem far from "causeless," certainly not so causeless looking as the depressions of manic-depressive insanity.

9. It can not be dogmatically asserted; but, on the whole, these patients seem more dominated by various ideas and by various more or less false beliefs than are the manic-depressives of earlier decades, and are perhaps more victims of intellectual than of emotional or volitional disorder. However, this may be more appearance than reality, and further work may again pull the emo-

tions, and particularly the depressive emotions, into the genetic foreground.

10. As to the designation "involution-melancholia" for these cases it may be surmised that the term was adopted by alienists having *unpleasant delusions* at least as much in mind as *unpleasant mere emotions.* Perhaps it is unwise to seek to overthrow the classical term before more intensive work has been done on the actual relation of the intellect to the emotions in this group: how far, then, it may be asked, is the melancholia of involution, merely systematic and responsive to intellectual conditions?

11. Since Freud has claimed a sexual basis for paranoia and even perhaps for paranoic states falling short of paranoia it is fair to inquire how far the present group has a sexual basis: three of the fifteen female cases in our series harbored rather systematic delusions of persecution, and all three systems had a sexual tinge. This fact, allocated with the not infrequent tendency to disorder of glands of internal secretion in certain cases, ought to provide a fruitful field for psycho-analytic hypotheses.

12. Hallucinations, as a rule auditory, were observed in something like 60 per cent. to 70 per cent. of the cases: there are *a priori* reasons (Wernicke) for relating these with the unpleasant delusions characteristic of the group; but, whether the false beliefs irradiate over to incite the hallucinations, or whether the hallucinosis is a prime factor in producing the false beliefs, must remain an open question: statistically we should be forced to favor the former process.

13. The post-mortem data throw some light on the negative definition of our group (see Paragraph 3). There appears to be little or no evidence that the metabolic disorder, if there be such underlying this group, tends to brain wasting.

14. Our study of the distribution of certain chemically ill-defined lipoids (or pigments, as we have called them) shows that age plays some part in the amount of deposits, perhaps more in the neuroglia cells than in the nerve-cells, and least of all in the perivascular phagocytes.

15. All patients living three years or more after onset of symptoms show more or less marked accumulations of pigment in neuroglia cells; the same cases show a greater variability in the nerve-cell accumulations; occasionally such a three-year or over-three-years case will show a negligible amount of pigment in perivascular phagocytes.

16. These pigment-findings are in substantial agreement with those of Southard-Mitchell, 1908: (a) "Perivascular cell pigmentation almost uniform in different areas of the same case." The present series presents only two instances of marked variability from area to area. (b) "Neuroglia cell pigmentation . . . varies more or less directly with age." Our present group presents more variation than did the former; there is, however, no absolutely negative case over 46 years of age. (c) "Nerve-cell pigmentation is not a function of age." Two patients of 50 years or more showed no appreciable amount of pigment, and three others showed but slight amounts. The variations in amount within a given brain are more striking than the variations shown by the neuroglia cell pigments.

17. That these three loci for the deposition of pigment tend at last to a series of saturation is indicated by the fact that the *even* degrees of moderate or of marked pigment deposit in all loci begin to appear in the later years of life (one case at 49 years, one at 56, and the rest from 59 to 75 years).

18. The fresh point of view thus obtained for the problem of involution-melancholia by our study of fifth-decade insanities may be stated as follows:

Involution-melancholia has been regarded as possibly akin to manic-depressive insanity or even identical therewith or as possibly something quite different. Perhaps the majority of psychiatrists would regard it as a disease akin to manic-depressive insanity but modified by climateric or presenile changes and distinguished from manic-depressive insanity by the peculiar tendency to depression which has given it its name. The novel feature of our investigation has been to study the age factor. We have studied unselected cases arising in the fifth decade of life, excluding all coarse organic cases of brain lesion. Our resultant group is, we believe, although small, otherwise ideally representative of the conditions underlying mental disease at this age-level. Our group includes a sufficient number of the familiar cases of involution-melancholia as well as cases of delusional insanity without melancholia. The striking fact is that the *melancholia* cases prove also *delusional*. In so far as our group is representative of the fifth decade, we believe that the essential *psychopathia involutionis* is characterized by delusions, that in the large majority of cases melancholia is a feature superadded to the delusions, and that in a small majority of cases hallucinosis also occurs. The fact that melancholia may assert itself as the most prominent symptom in the clinical foreground fails to controvert the possible genetic importance of the delusions. As to the cause of *psychopathia involutionis,* it is easy to invoke the glands of internal secretion; and of their disorder there is actually some sign in a number of cases. Whether such disorder or some unknown factor determines the over-pigmentation (lipoid accumulations) in the cortex above noted, and whether these deposits have a direct relation to the symptoms must rest with the future.

**The Psychosis Occurring During the Course of Pernicious Anemia.** G. H. Williams,[9] of the Columbus (Ohio) State Hospital, relates the clinical histories of two cases of pernicious anemia in which the mental symptoms had been of sufficient severity to necessitate commitment to a state institution for the insane. The author finds that when it comes to classifying these two cases we discover no definite group in which to place them unless it should be the intoxication psychoses:

"To summarize, we have two individuals with well defined pernicious anemia, showing in common many mental signs, namely, lack of orientation—in the one case in every field and in the other especially in regard to place; lack of insight; such delusions as we commonly meet in paranoid states—those of a persecutory type; the memory in one case apparently normal, until late in the condition, while in the other there was lack of accuracy for both recent and remote events; the mood in both

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(9) Jour. Amer. Med. Assn., September 12, 1914.

parties much happier than the physical condition would warrant; lack of attention and appreciation, and numerous physical signs such as paresthesias, diminished sensibilities, vertigo, speech disturbances, loss of functions of the arms and legs, ankle-clonus, unequal patellar reflexes, Romberg sign, unsteady gait. Apart from the abnormal mental conditions present it is evident that we are dealing with some lesions of the brain and spinal cord, such as have been described by various writers in their reports of cases.''

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